DOCUMENT RESUME

ED 256 585 SE 045 517

TITLE Comprehensive Instructional Management System (CIMS). A Cyclical Mathematics Curriculum. Part 1--Teacher. Experimental. Level 3.

INSTITUTION New York City Board of Education, Brooklyn, N.Y. Div. of Curriculum and Instruction.

REPORT NO Curric-00-6003-22; ISBN-0-88315-520-6

PUB DATE 83

NOTE 253p.; For part 2 of teacher's manual see SE 045 518. For student workbook see SE 045 515-516. For the entire series, see SE 045 503-534. All material in the student manuals is duplicated in the teacher manuals.

AVAILABLE FROM New York City Board of Education, Curriculum Production Unit, Room 617, 131 Livingston St., Brooklyn, NY 11202.

PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC11 Plus Postage.

DESCRIPTORS Computation; *Elementary School Mathematics; *Grade 3; Instructional Materials; Learning Activities; Mathematics Curriculum; *Mathematics Instruction; Number Concepts; Objectives; Primary Education; *Teaching Methods; Workbooks

IDENTIFIERS Comprehensive Instructional Management System

ABSTRACT

This is the teacher's manual to accompany part 1 of the workbook for grade 3 pupils in the Comprehensive Instructional Management System, a teacher-designed unified mathematics curriculum for kindergarten through grade 7. It is composed of a curriculum, a testing component, and a computer-managed reporting system. The curriculum is organized into modules of similar skills or understandings from 14 topics. Each module has: a suggested period of duration for student mastery; a listing of new skills to be mastered by the student in the form of performance objectives; a section devoted to vocabulary, terms, and symbols; getting-started activities on prerequisite skills in preparation for undertaking new objectives; strategies for teaching the new skills; and student activities for providing reinforcement for the newly learned objective. After the sequence of modules and content by topic are displayed, teaching suggestions for 68 modules on 69 performance objectives are given. The content is from the topics of: numbers and numeration; addition; subtraction; multiplication; division; fractions; decimals; geometry; measurement; algebraic concepts; graphs, probability, and statistics; and problem solving, plus review. Pages from the student's workbook are interspersed with the suggested activities. (MNS)

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CIMS

COMPREHENSIVE INSTRUCTIONAL MANAGEMENT SYSTEM

A Cyclical Mathematics Curriculum

PART 1—TEACHER

NEW YORK CITY BOARD OF EDUCATION
OFFICE OF CURRICULUM DEVELOPMENT AND SUPPORT
DIVISION OF CURRICULUM & INSTRUCTION

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ISBN No. 0-88315-520-6 Curric. No. 00-6003-22

Copies of this publication may be purchased from: the Curriculum Production Unit, Room 617, 131 Livingston Street, Brooklyn, N.Y. 11201. Checks should be made payable to "Publication Sales."
See catalogue for price.

FOREWORD

The Comprehensive Instructional Management System (CIMS) is a unified mathematics curriculum for grades K-7. The curriculum is cyclical in design, and reflects the most recent New York City and New York State guidelines.

Utilizing the experience of our system's teachers, we have developed a teacher-designed curriculum that includes a rich selection of classroom-tested successful mathematics activities. The major goal of the CIMS mathematics project is to provide the classroom teacher with a well-structured, objective-based curriculum. All objectives are supported by a variety of strategies. Student mastery of these objectives is readily diagnosed through the system's testing component.

The curriculum format is structured to allow the teacher to determine the ability level of the students in the topic under study, and to permit the students to move forward at their individual rates. Each module of instruction provides the teacher with a set of related performance objectives. These objectives are supported by activities which probe and develop the students' readiness to undertake new skills and concepts. Further reinforcement is given to mastery of the objectives through accompanying student workbooks.

It is hoped that this curriculum will not only assist teachers in developing vital mathematics instruction, but will serve to expand and enrich students' mathematics skills.

Charlotte Frank

Charlotte Frank,
Executive Director
Division of Curriculum and Instruction

ACKNOWLEDGMENTS

The Comprehensive Instructional Management System (CIMS) was developed as a project of the Division of Curriculum and Instruction, Charlotte Frank, Executive Director. Dr. Peter Negroni, Community School Superintendent CSD 12; Dr. Harvey Garner, Community School Superintendent CSD 18; Carlos Edwards, Community School Superintendent CSD 23, and Joseph Pacheco, Community School Superintendent CSD 32 supervised the overall development of the CIMS program within their respective districts.

Morris Freedman, Director of the Office of Curriculum Development and Support; Irwin Kaufman, Director of Mathematics; Kenneth Bates, Director of CIMS; Maria DeSalvio, Assistant Director of Mathematics; Arthur Flug and Doreen Genkin, Assistant Directors of CIMS and Gene Menchini, Program Manager, Distributive Systems, Office of Data Processing Coordination provided overall supervision of this project.

Division of Special Education

Overall supervision of curriculum in addressing those students with special needs was coordinated by Edward M. Sermier, Chief Administrator, Division of Special Education.

Allan Dobrin, Office of Chief Administrator; Bebe Bernstein, Administrator, Curriculum Development Unit of the Office of Program Development and Geraldine Silver and Susan Wieder, Special Education Coordinators provided guidance and support in addressing these special needs.

Consultants

The program consultants responsible for reviewing the curriculum for mathematics accuracy were:

Harry Ruderman, Assistant Principal Supervision/Mathematics, Hunter College High School (Retired)
Helene Silverman, Associate Professor, Lehman College

Principal Writers

The principal writers responsible for planning the scope, sequence and engaging in the necessary research in writing of the modules were:

Stephen Rappaport, Assistant Principal I.S. 171K
Sara Jane Bass, CIMS Curriculum Leader
Judith Fein, CIMS Curriculum Leader
Lorraine Wan, CIMS Curriculum Leader
Rochelle Watnick, CIMS Curriculum Leader

CIMS District Curriculum Workshops

Each of the participating CIMS community school districts organized a curriculum workshop to write the various curriculum levels.

Community School District 12		Community School District 18	
Mary J. Teshara	District Mathematics Coordinator	Jack Friedman	CSD 18, Director CIMS
Valentin Acabeo	C.S. 134X	Selma Mitlitsky	District Mathematics Coordinator
James F. Gilligan	I.S. 116X	Eileen Backer	P.S. 135K
Selma Gunther	C.S. 50X	Lillian Frechtman	P.S. 279K
Betty Anne Jackson	C.S. 47X	Merle Glass	P.S. 219K
Mark Lehrer	I.S. 158X	Howard Mankes	P.S. 219K
Jewel R. Moolenaar	I.S. 143X	Lillian Pecker	J.H.S. 252K
Marcia Ann Rudnitsky	C.S. 102X	Virginia Pero	J.H.S. 211K
March Dale Stecker	C.S. 47X	Carol J. Reale	P.S. 235K
Ira K. Victor	C.S. 77X	Arlie Solola	J.H.S. 252K
Leonard Zavlick	C.S. 92X	Renee M. Tardi	P.S. 219K

Community School District 23

Wallace Dimson,	District Mathematics Coordinator
Gloria Allen	
Marshall Belson	P.S. 183K
Abraham Butensky	P.S. 165K
Janice Ellenbogen	P.S. 298K
Ruth Fennell	P.S. 298K
Gladys H. Galamison	P.S. 156K
Bruce Landau	P.S. 327K
George McMullen	P.S. 183K
Carmella Murden	J.H.S 275K
Martha Hilinski-Pepe	P.S. 327K
Rochelle Sanders	P.S. 327K
Gary Wexler	P.S. 41K
Priscilla A. Williams	I.S. 271K
Frederick Zwibel	P.S. 184K

Community School District 32

Aurora Larocca,	District Mathematics Coordinator
Pedro J. Colon	J.H.S. 111K
Dorothy A. Conroy	P.S. 116K
Joan Fox	P.S. 116K
Steven Ganzell	I.S. 291K
Akhtar A. Khan	I.S. 291K
Lenore Marie Messina	P.S. 151K
Joanne Narisi	P.S. 299K
George Silverglad	P.S. 274K
Norma Warmund	P.S. 45K
Stephen Elliot Weiss	P.S. 274K
Martin Weissman	P.S. 384K

Citywide Curriculum Developers

Judy Z. Cohen	Corr. Math. N.P.S.	Carmen B. Matthews	CSD 3 J.H.S. 88M
Nancy R. Coleman	CSD 19 Staff Dev.	Edythe Ogin	CSD 19 I.S. 171K
Carl Conetta	Special Ed. Bronx	Joseph A. Porzio	CSD 19 Staff Dev.
Gerri T. Dunne	Corr. Math. N.P.S.	Fred Remer	CSD 6 Math Coord.
Meryl Glass	CSD 22 P.S. 139K	Jon Rothfeld	CSD 19 Staff Dev.
David A. Gold	CSD 19 Staff Dev.	Marvin Schneider	Edward R. Murrow H.S.
Stuart Goldberg	CSD 19 Staff Dev.	Leila Schwartz	Corr. Math. N.P.S.
Michelle Greenberg	CSD 28 P.S. 160Q	Angelina Spero	Corr. Math. N.P.S.
Joyce Jalowski	Corr. Math. N.P.S.	Martin L. Spiro	CSD 19 I.S. 302
Margaret Jordan	Corr. Math. N.P.S.	Bernice Staub	Corr. Math. N.P.S.
Jeffrey Joyce	CSD 15 I.S. 88K	Madeline Sussman	CSD 1 P.S. 142M
Nicholas C. Leo	Corr. Math. N.P.S.	Robert B. Weiss	CSD 28 J.H.S. 190Q
Elaine J. Kaplan	CSD 28 J.H.S. 157Q	Bernice Zuckerman	CSD 19 Staff Dev.
Joan Mahon	CSD 19 Staff Dev.		

Citywide Curriculum Illustrators

Joyce Abramowitz	CSD 26 J.H.S. 158Q	Edward Kissane	Beach Channel H.S.
Amy Appleman	CSD 22 P.S. 194K	Susan M. Seidler	Corr. Math. N.P.S.
Paula J. Blanes	CSD 15 P.S. 39K	Dolores Soldo	Special Ed. Brooklyn
Nina Cucchiari	Special Ed. Bronx	Sandy Susser	Special Ed. Bronx
Charles B. Flisser	Special Ed. Bronx		

Citywide Curriculum Editors

Meryl Fenster	CSD 30 P.S. 171K	Laura J. Lederman	CSD 26 J.H.S. 158Q
Robert Greenman	James Madison H.S.	Mary Newsom-King	CSD 8 J.H.S. 101X
Stephanie Lang-Goldsmith	Special Ed. Queens	Lorraine Wittman	CSD 25 P.S. 169Q

Production Staff

Anne Cohen, Education Analyst
Dorothy Johnson, Office Associate

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INTRODUCTION

The Comprehensive Instructional Management System (CIMS) is a teacher-designed educational delivery system composed of a curriculum, a testing component and a computer managed reporting system.

Designed to support mathematics instruction in the classroom, CIMS provides a comprehensive cyclical mathematics curriculum for grades K through 7. Each manual describes the curriculum for a single level or grade. Teacher curriculum developers from elementary, intermediate and senior high schools utilized the most current New York City and New York State guidelines in formulating the curriculum's modules and sequence.

Curriculum Topics

The CIMS mathematics curriculum has been organized into the following 14 topics:

.01 Numbers and Numeration
.02 Addition of Whole Numbers
.03 Subtraction of Whole Numbers
.04 Multiplication of Whole Numbers
.05 Division of Whole numbers
.06 Fractions
.07 Decimals
.08 Integers
.09 Geometry
.10 Measurement
.11 Algebraic Concepts
.12 Graphs, Probability, Statistics
.13 Problem Solving
.14 Review

Modules of Instruction

The CIMS curriculum is organized into modules or groupings of similar skills or understandings. Each module has a suggested period of duration for student mastery, a listing of new skills to be mastered by the student in the form of performance objectives, a section devoted to vocabulary, terms and symbols, getting started activities which serve as prerequisite skills in preparation for undertaking new objectives, strategies for teaching the new skills and student activities for providing reinforcement for the newly learned objective. Note that

the lesson duration is included only as a guideline to the teacher for planning purposes. The actual time required for each module will vary from class to class and from child to child depending on the needs of the students and the teacher's judgment.

Priorities of Performance Objectives

There is an order of priority to be recognized in teaching the content presented in the CIMS NEW YORK CITY MATHEMATICS CURRICULUM. Performance objectives with the greatest priority are so basic that unless the student acquires a satisfactory degree of competency in them, the student cannot progress. Such topics are marked A and mastery by all pupils is essential.

Performance objectives marked B are required to be presented to all students. Mastery is not expected at this time. These objectives will be developed further and reinforced later.

Performance objectives marked C are of special interest. These should be taught to increase positive attitudes towards mathematics.

Summary: A - Mastery of this objective is essential for progress. Opportunities for reinforcement should be provided throughout the school year.

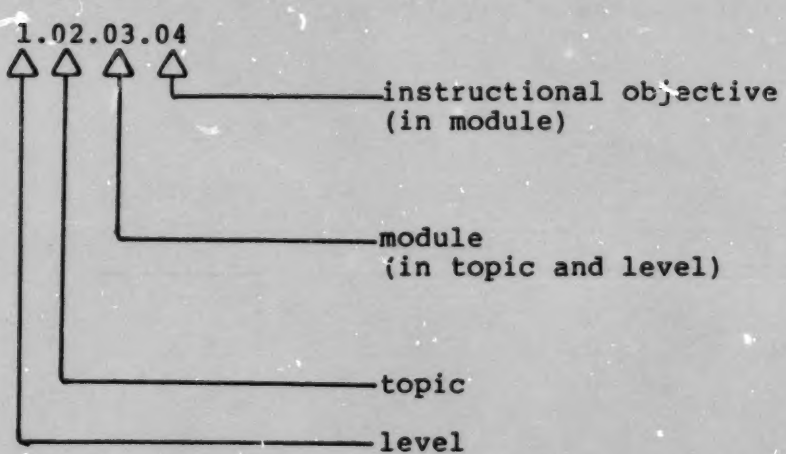
B - These objectives are to be taught to all pupils. Mastery is not essential at this time because the topics will be further developed and reinforced.

C - Objectives of special interest.

Topic Tab Key

01. Numbers and Numeration
02. Addition of Whole Numbers
03. Subtraction of Whole Numbers
04. Multiplication of Whole Numbers
05. Division of Whole Numbers
06. Fractions
07. Decimals
08. Integers
09. Geometry
10. Measurement
11. Algebraic Concepts
12. Graphs, Probability, Statistics
13. Problem Solving
14. Review

Module Coding Key



INSTRUCTIONAL SEQUENCE DESCRIPTION

An instructional sequence is given in list form on the following pages for this level. The sequence has been arranged to reflect what is considered the most effective presentation of the mathematics curriculum. Each module in the list is described by its unit number, module number, title, and page location.

The CIMS tests are integrated within the manual sequence. The test number is located in the first column. Each test is designed to assess priority objectives from the preceding modules. The tests are used to determine student mastery of specific performance objectives within these modules and appear in a multiple choice format. Each performance objective code number preceded by an * indicates that the performance objective is not tested on a CIMS test.

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INSTRUCTIONAL SEQUENCE - LEVEL 3

TEST NUMBER	UNIT NUMBER	MODULE NUMBER	TITLE	PAGE NUMBER
	1	3.14.01	Basic facts	1
	2	3.10.01	Days and dates on a calendar	2
	3	3.12.01	Bar graphs	4
	4	3.04.01	The identity element (1) for multiplication and the role of zero	5
3.01	5	3.04.02	Multiplication facts	6
	6	3.05.01	Concepts of division	7
	7	3.10.02	Measurement - time	8
	8	3.06.01	Equivalent fractions	10
3.02	9	3.10.03	Weight in customary units	12
	10	3.10.04	Weight in metric units	13
	11	3.14.02	Place value and expanded notation through 999	14
	12	3.01.01	Count by tens and hundreds	15
	13	3.01.02	Round 2- and 3-digit numbers to the nearest ten/hundred	16
	14	3.01.03	Place value through 9,999	18
3.03	15	3.02.01	Addition of 3-digit numbers	20
	16	3.02.02	Addition of 3-digit numbers with one regrouping (exchange) ones to tens	21
	17	3.14.03	Subtraction with regrouping ones for tens	22
	18	3.03.01	Subtraction with one regrouping (exchange) tens to ones	24
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	21	3.05.02	Division of whole numbers (for twos through 18, for fives through 45)	27
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INSTRUCTIONAL SEQUENCE - LEVEL 3

TEST NUMBER	UNIT NUMBER	MODULE NUMBER	TITLE	PAGE NUMBER
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	24	3.02.03	Addition of 2-digit numbers with one regrouping (exchange) tens to hundreds	30
	25	3.02.04	Addition of 3-digit numbers with two regroupings (exchange) ones for tens, tens for hundreds	31
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INSTRUCTIONAL SEQUENCE - LEVEL 3

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3.14.02 Place value and expanded notation through 999..... 14
3.14.03 Subtraction with regrouping ones for... 22 tens

3.14.01 BASIC FACTS

(ongoing)

PERFORMANCE OBJECTIVES

The student will be able to...

3.14.01.01 recall the addition facts through 18;
e.g.,

4 + 3 = 7
3 + 4 = 7

3.14.01.02 recall the subtraction facts through 18.
e.g.,

10 - 8 = 2
10 - 2 = 8

3.14.01

VOCABULARY

TERMS

sum
difference

GETTING STARTED

Prepare and distribute 20 discs to each student. Write the following examples on the chalkboard, 6 + 2 = ☐ , 5 + 5 = ☐ , 9 + 4 = ☐ . Say, "Use your discs to find the answers." Ask several students to come to the chalkboard to write the correct sum. Repeat this procedure using other examples.

Write the following examples on the chalkboard, 16 - 9 = ☐ , 8 - 2 = ☐ , 12 - 5 = ☐ . Say, "We are going to use the students in the class to find the answers to these examples." Ask 16 students to stand at the front of the classroom. Say, "How many students must sit down in order to find the answer?" Elicit that 9 must sit down. Say, "How many are left?" Elicit that 9 are left . Ask one student to come to the chalkboard to write the difference.

Repeat this procedure with the other examples.

3.14.01

3.14.01.01 **recall the addition facts through 18**

STRATEGY 1: Prepare and distribute the following sheet to each student.

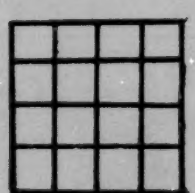
e.g.,

+	1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9	10
2									
3									
4									
5									
6									
7									
8									
9									

Ask the students to complete the table by addition as shown in the first row.

STRATEGY 2: Play addition Bingo. Distribute one blank sheet of paper to each student. Ask the students to fold a paper into sixteen parts.

e.g.,



Ask the students to write one sum in each box. They may write the same number more than once. Use addition flash cards. Display one card at a time. If a student has the sum of the example on his/her sheet, he/she covers it with a piece of paper or disc. Continue this procedure until one student has 4 boxes covered horizontally, vertically or diagonally. Repeat the game several times.

3.14.01

3.14.01.02 **recall the subtraction facts through 18**

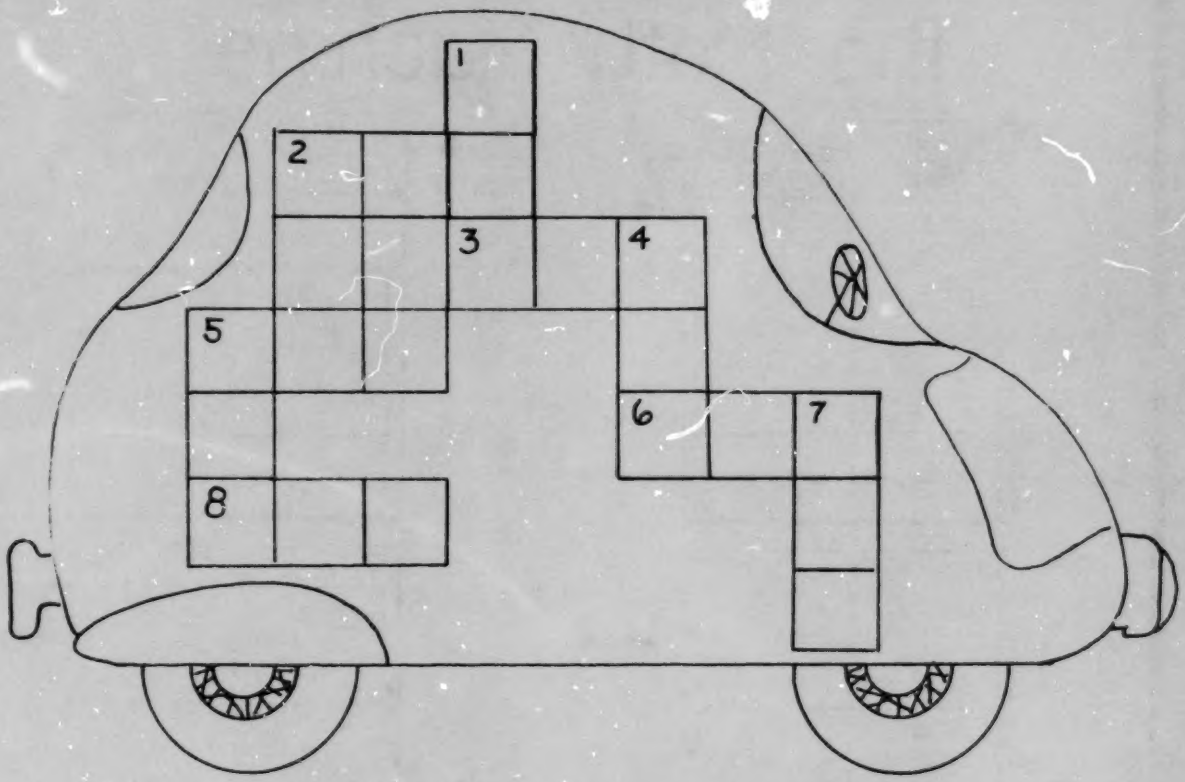
STRATEGY 1: Prepare subtraction flash cards. Go around the classroom in round robin fashion showing a card and giving each student a chance to respond. Repeat this procedure until all cards have been used.

STRATEGY 2: Play "Subtraction Quiz". Divide the class into two (2) teams. Ask each team to select a name. Ask the first member of each team to go to the chalkboard. Say, "Six minus three." The student who writes the difference first, gets a point for his/her team. Repeat this procedure until one team has 15 points.

P.O. 3.14.01.01

NAME: _____ CLASS: _____ DATE: _____

Solve the examples. Write the answers in the puzzle.



ACROSS

② 531 + 443

③ 102 + 224

⑤ 431 + 432

⑥ 212 + 345

⑧ 350 + 222

DOWN

① 121 + 522

② 524 + 412

④ 341 + 354

⑤ 404 + 411

⑦ 347 + 441

P.O. 3.14.01.01.02

NAME: _____ CLASS: _____ DATE: _____

TO FIND THE OUTPUT, USE THE INPUT AND THE RULE.

The Math Machine

Rule: ADD 8

Input	Output
6	
5	
7	
9	

Rule: SUBTRACT 4

Input	Output
10	
8	
5	
6	

Rule: SUBTRACT 3

Input	Output
12	
9	
7	
6	

Rule: ADD 9

Input	Output
4	
7	
3	
1	

Rule: ADD 5

Input	Output
4	
8	
7	
3	

Rule: SUBTRACT 2

Input	Output
7	
9	
6	
4	

3.10.01 DAYS AND DATES ON A CALENDAR

(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.10.01.01A relate days and dates from a given calendar date;
e.g.,

1978 SEPTEMBER 1978

S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

READ:
Tuesday, September 15, 1978
or
Tuesday, 9/15/78

3.10.01.02A identify number relationships among day, week, month and year;
e.g.,

7 days = 1 week
approx. 4 weeks = 1 month
12 months = 1 year
365 days = 1 year
366 days = 1 leap year

3.10.01.03A solve word problems related to skills learned in this module.

e.g.,

read schedules indicating time such as a monthly calendar of events

November

Election Day	11/ 8/83
Veteran's Day	11/11/83
Thanksgiving Day	11/24/83

3.10.01

VOCABULARY

TERMS

leap year
date

GETTING STARTED

Construct flash cards with the days of the week and the months of the year on them. Distribute to 7 students the days of the week cards. Say, "Come to the front of the room and stand in order according to your place on the calendar. What is the first day of the week?" Elicit from the students that Sunday is the first day of the week. Repeat this procedure using the months of the year. Say, "When I point to you, say the name of your month. Extra credit will be given to each student who tells how many days are in his/her month."

Using the class calendar, ask the following questions:

"How many days are in this month?
What is the date of the first Tuesday in this month?
What is the date of the last Thursday in this month?"

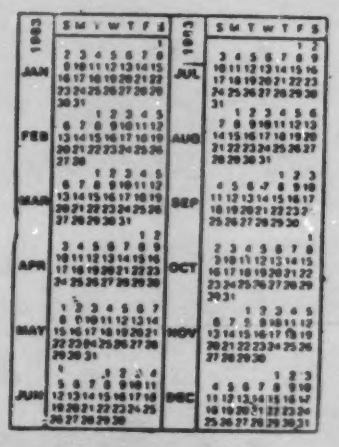
Continue asking other questions so that each student has one chance to respond.

3.10.01

3.10.01.01 **relate days and dates from a given calendar date**

STRATEGY 1: Distribute a blank calendar to each student. Ask the students to fill in the calendar for the month in which this lesson is given. Make sure that each student begins the month on the proper day. Say, "We are going to use this calendar to locate dates. What is the date of the second Friday in this month?" Ask a student to come to the chalkboard to write Friday, September 12, 1983. Repeat this procedure several times. Then say, "There is a shorter way to write the date. In order to do this we must give each month a number." Ask the students which is the first month of the year. Elicit January. Say, "What number should we designate to January?" Elicit 1. Continue this procedure, writing the month, and their corresponding numbers on the chalkboard. Say that since September is the ninth month, Friday, September 16, 1983 is written in month/day/date form as Friday, 9/16/83. Say, "When we write the date using numbers only, we only write the last two digits of the year because we assume the first two will be 19." Ask the students to write the previously written dates using this shorter form.

STRATEGY 2: Obtain from local bank or other agency a set of wallet sized yearly calendars.
e.g.,



STRATEGY 2: cont'd

Distribute one to each student. Say, "Using the calendar, locate your birthday. Write the day and date of your birthday this year." Use your own birthday as an example, writing it on the chalkboard, e.g. Monday, July 25, 1983. Ask several students to come to the chalkboard to write the day and date of their birthdays. Say, "There is another way to write the date." Say that a number may be substituted for the name of the month, e.g., January is 1, March is 3, etc. Write the months in order on the chalkboard with their numeric designation. Ask each student to rewrite his/her birthday numerically using the month/day/date format. Say, "When we write the date numerically we only write the last two digits of the year because we assume the first two will be 19."

3.10.01.02 identify number relationships among day, week, month and year

STRATEGY 1: Say, "What are some of the words we use when talking about a calendar?" Elicit the words <u>days</u>, <u>weeks</u>, <u>months</u> and <u>years</u>. Say, "What are the relationships among these?" Elicit the following relationships.

e.g.,

7 days	=	1 week
4 weeks	=	1 month (approximate)
12 months	=	1 year
365 days	=	1 year
366 days	=	1 leap year

Say, "How many days are there in two weeks? How many weeks are there in 3 months?"

3.10.01

STRATEGY 2: Say, "Look at the class calendar. It is divided into weeks. How many days are in one week?" Elicit from students that there are 7 days in one week. Ask a student to go to the calendar and count how many days there are in 2 weeks. Elicit from students that there are 14 days in 2 weeks. Say, "Is there a shorter way to find out how many days there are in two weeks?" Elicit from students that 7 days x 2 weeks = 14 days. Repeat this procedure substituting other relationships for days, weeks, months and years.

3.10.01.03 solve word problems related to skills learned in this module

STRATEGY 1: Duplicate and distribute a copy of the current school calendar listing school holidays and vacations in the following manner:

Monday, 9/14/83	First day of School
Monday 10/11/83	Columbus Day
-	-
-	-
-	-
Tuesday, 6/27/84	Last day of School

Say, "This is a schedule of important events in the school year. When you answer questions about the schedule use and ask for the names of the months, not the numbers.

e.g.,

On what day and date does the Christmas vacation end?

When do we celebrate Abraham Lincoln's birthday this year?

3.10.01

STRATEGY 2: Say, "Let's make a list of the important holidays for this year." Prepare an overhead transparency of a yearly calendar. Say, "Let's look at January. What holidays are in January? What is the date of New Year's Day?" Write the date, using the numeric form, e.g., Tuesday, 1/1/84. Repeat this procedure for the holidays of each month.

P.O. 3.10.01.01

NAME: _____ CLASS: _____ DATE: _____

Use the calendar to answer the questions. Write the dates in two ways.

MAY						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	5	6	7	8	9	10
Mother's Day 11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	Memorial Day 26	27	28	29	30	31

1. Give the date of the second Wednesday in the month. _____
2. What is the date of the fourth Saturday? _____
3. On what day is May 20? _____
4. Give the date of the third Tuesday in the month. _____
5. On what day and date is Mother's Day? _____
6. On what day and date is Memorial Day? _____
7. What is the date of the fifth Thursday in the month? _____

_____

P.O. 3.10.01.02

NAME:_____ CLASS:_____ DATE:_____

Fill in the blanks.

Each week has _____ days.

In three weeks there are _____ days.

In five weeks there are _____ days.

In one year there are _____ months.

In one year there are _____ days.

There are _____ months in three years.

There are _____ days in a leap year.

There are approximately _____ weeks in two months.

There are _____ days in seven weeks.

Sun.	Mon.	Tues.	Weds.	Thurs.	Fri.	Sat.

P.O. 3.10.01.C3

NAME: _____ CLASS: _____ DATE: _____

Use the calendar to answer the questions.

FEBRUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

1. Write the day and date for each holiday.

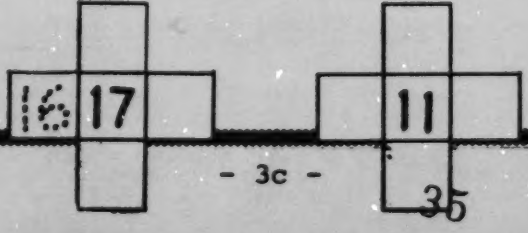
   Washington's Birthday _____.
   Valentine's Day _____.
   Lincoln's Birthday _____.

2. Circle every Friday on the calendar. What is the pattern?
   _____

3. What date comes before February 1? _____.

4. What date comes after February 28? _____.

5. This is taken from the calendar. Fill in the boxes that are empty:



3.12.01 BAR GRAPHS

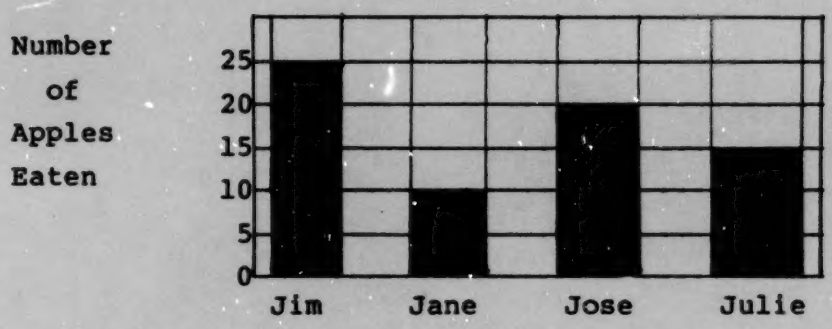
(2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.12.01.01A read and interpret a bar graph;
e.g.,

Apples Eaten This Week



Jim ate 25 apples.
Jane ate 10 apples.
Jose ate 20 apples.
Julie ate 15 apples.

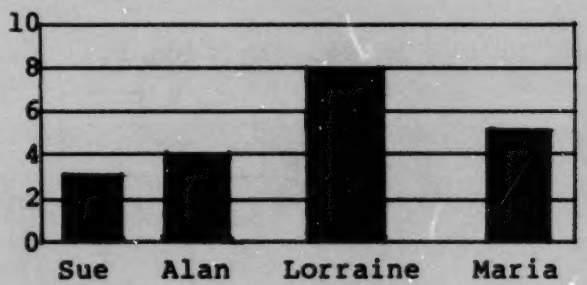
How many apples did Jose eat?
Who ate the most apples? least?

3.12.01.02B construct a bar graph.
e.g.,

Table

Letters in your name

Sue	- 3
Alan	- 4
Lorraine	- 8
Maria	- 5



3.12.01

VOCABULARY

TERMS

graph
data
vertical axis
uniform bars
horizontal axis

GETTING STARTED

Say, "We are going to take a survey of the students in our class regarding (choose one of the following)."
e.g.,

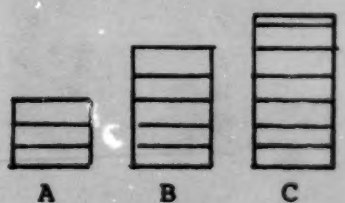
1. favorite colors
2. favorite flavors
3. favorite T.V. shows
4. color of hair
5. color of eyes

Ask each student to relate to the class his/her information. Write the information on the chalkboard.
e.g.,

Favorite Color		
Blue	𝍸 𝍸	10
Red	𝍸	5
Yellow	///	3
Green	///	3

Say, "We call these numbers data." Examine the data by asking the following questions, "What is the most popular color? What is the least popular color?" Continue this procedure using other topics for surveys.

Stack blocks in varying amounts. Label each stack A,B,C.
e.g.,



GETTING STARTED cont'd

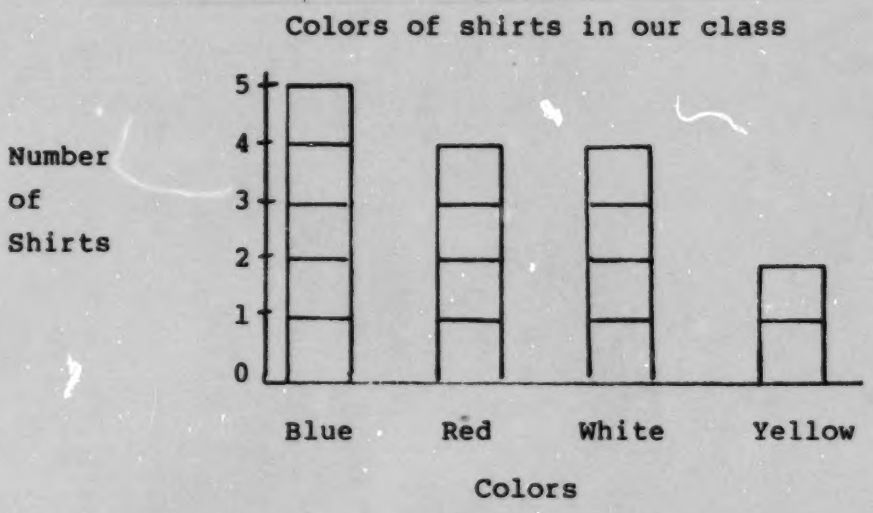
Say, "Which stack is the largest?" Elicit C. Say, "How many blocks are in the smallest stack?" Elicit 4. Continue asking questions about the blocks. Repeat this procedure after rearranging the stacks of blocks.

3.12.01

3.12.01.01 **read and interpret a bar graph**

STRATEGY 1: Prepare and display several samples of bar graphs. Say, "What is similar about these graphs?" Elicit from the class that each has a title, a labeled horizontal axis, a labeled vertical axis and uniformly wide bars.

Address the students attention to one of the graphs.
e.g.,



Say, "What colors are in our graph? (blue, red, white and yellow) What is the largest number of people who can wear any color shirt? (5) We have 5 students that are wearing blue shirts. (Point to the bar.) Therefore, we can see that the bar for the blue shirts goes up to 5."

Repeat this procedure for the red, white and yellow shirts. Continue asking questions about relative amounts of data.

3.12.01

STRATEGY 2: Either on the chalkboard or on oaktag prepare a large display bar graph.

Point out the basic parts of the graph.
e.g.,

1. Title
2. Labeled horizontal axis
3. Labeled vertical axis
4. Bars

Ask the students questions about the information shown on the graph, e.g., What item has the largest number? ...the smallest number? Is one item larger than another? ....smaller than another?

Repeat this procedure using various bar graphs.

3.12.01.02 **construct a bar graph**

STRATEGY 1: Prepare 30 colored squares for each group of 5 students. Prepare 30 large squares to use on the chalkboard for a demonstration. Write "Our Birthdays" on the chalkboard, and write each month.
e.g.,

Our Birthdays	
January	/
February	//
March	
April	///
.	
.	
.	
December	

Say, "Who has a birthday in January?" Make tally marks next to the month for each student who raises his/her hand.

STRATEGY 1: cont'd

Continue until all the birthdays have been recorded. Add each group of tally marks and write the number next to the marks.

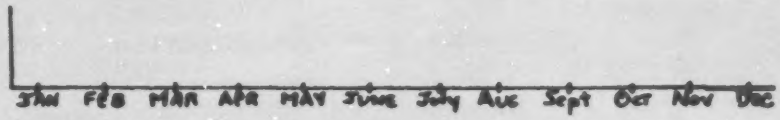
e.g., January ~~////~~ / 6

Distribute a sheet of graph paper, ruler and paper squares to each group. Tape a large oaktag graph sheet to the chalkboard. Ask one student to draw the horizontal and vertical axis.

e.g.,

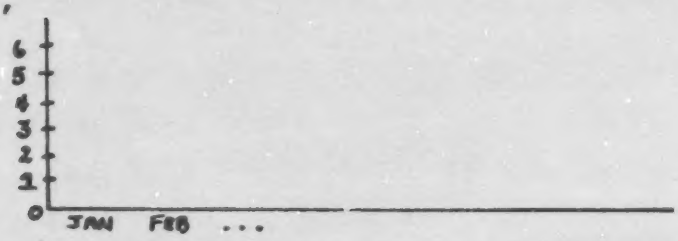
Ask another student to label the horizontal axis.

e.g.,



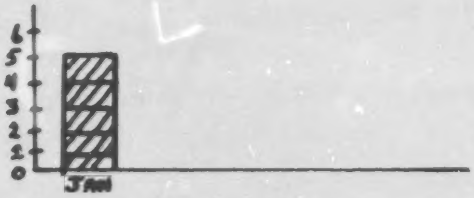
Ask a third student to label the vertical axis.

e.g.,



Using the data, ask and count aloud, how many of the students have birthdays in January. Ask a student to count out that number of squares and paste them one atop the other to form a bar above Jan.

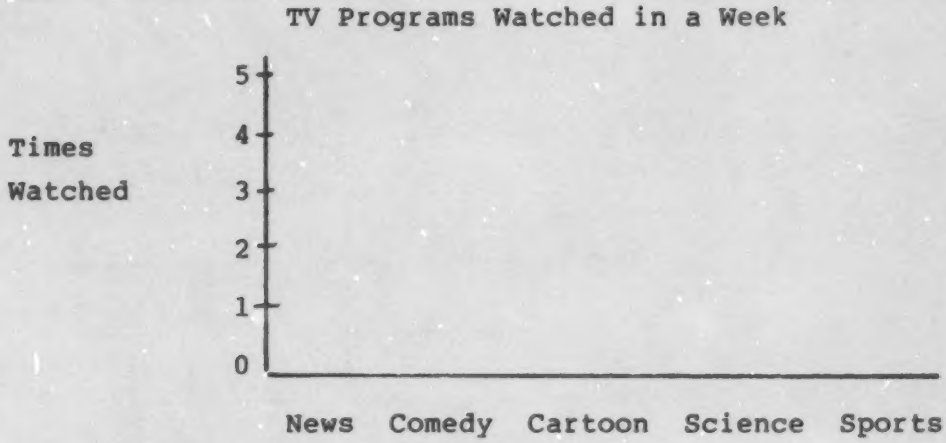
e.g.,



Demonstrate each step on the chalkboard chart. Continue this procedure until the graph is complete. Elicit from the students a title for the graph.

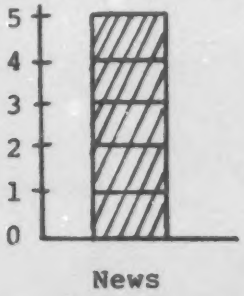
3.12.01

STRATEGY 2: Distribute a blank graph format to each student.
e.g.,



Gather the data by asking the students to raise their hands as the program and times watched are stated. Write in tally form on the chalkboard.
e.g.,
News ////
Comedy //// ////

Ask a student to count the tally next to each program and write the number. Ask each student to draw the number of boxes one on top of the other on his/her graph.
e.g.,



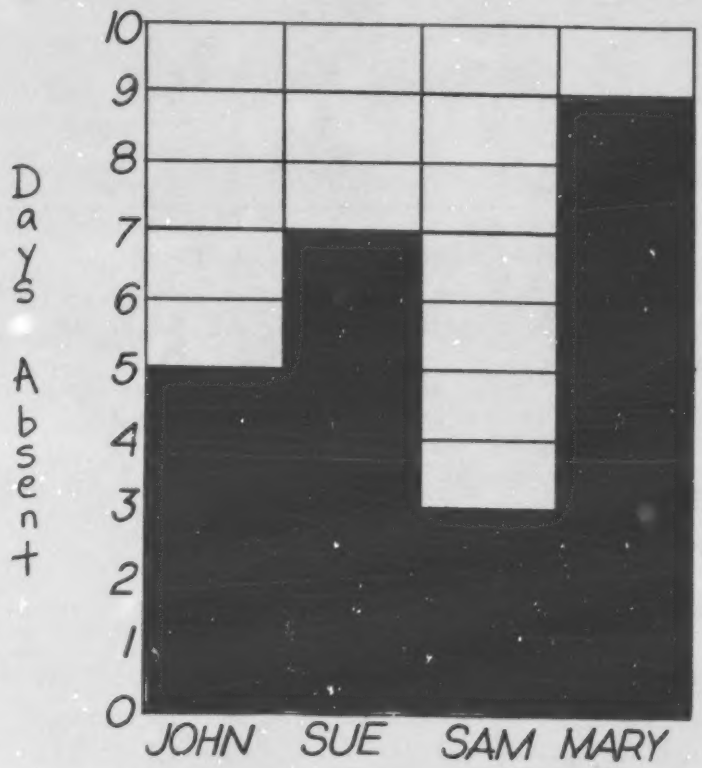
Allow students to color in the boxes.

Repeat this procedure until the graph is complete.

3.12.01.01
P.O. _____

NAME: _____ CLASS: _____ DATE: _____

Use the graphs to answer the questions.



EXAMPLE

1. Who was absent the most? MARY

2. Who was absent the least? _____

3. Who was absent more John or Sue? _____

4. How many days was Mary absent? _____

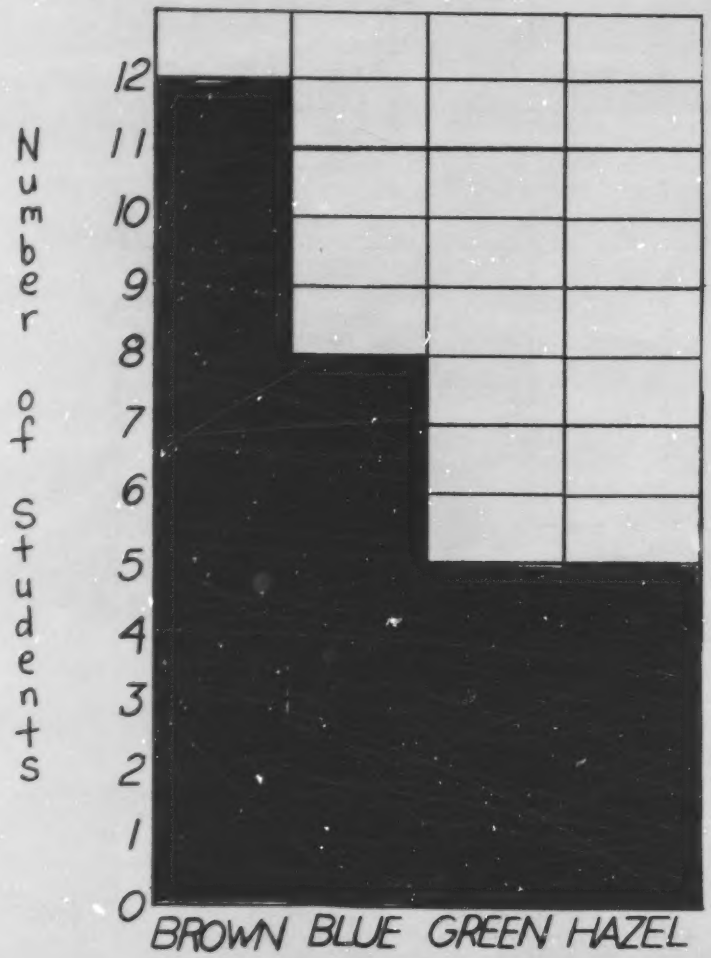
5. How many days was John absent? _____

P.O. 3.12.01.01

NAME: _____ CLASS: _____ DATE: _____

Use the graphs to answer the questions.

COLOR OF EYES IN OUR CLASS

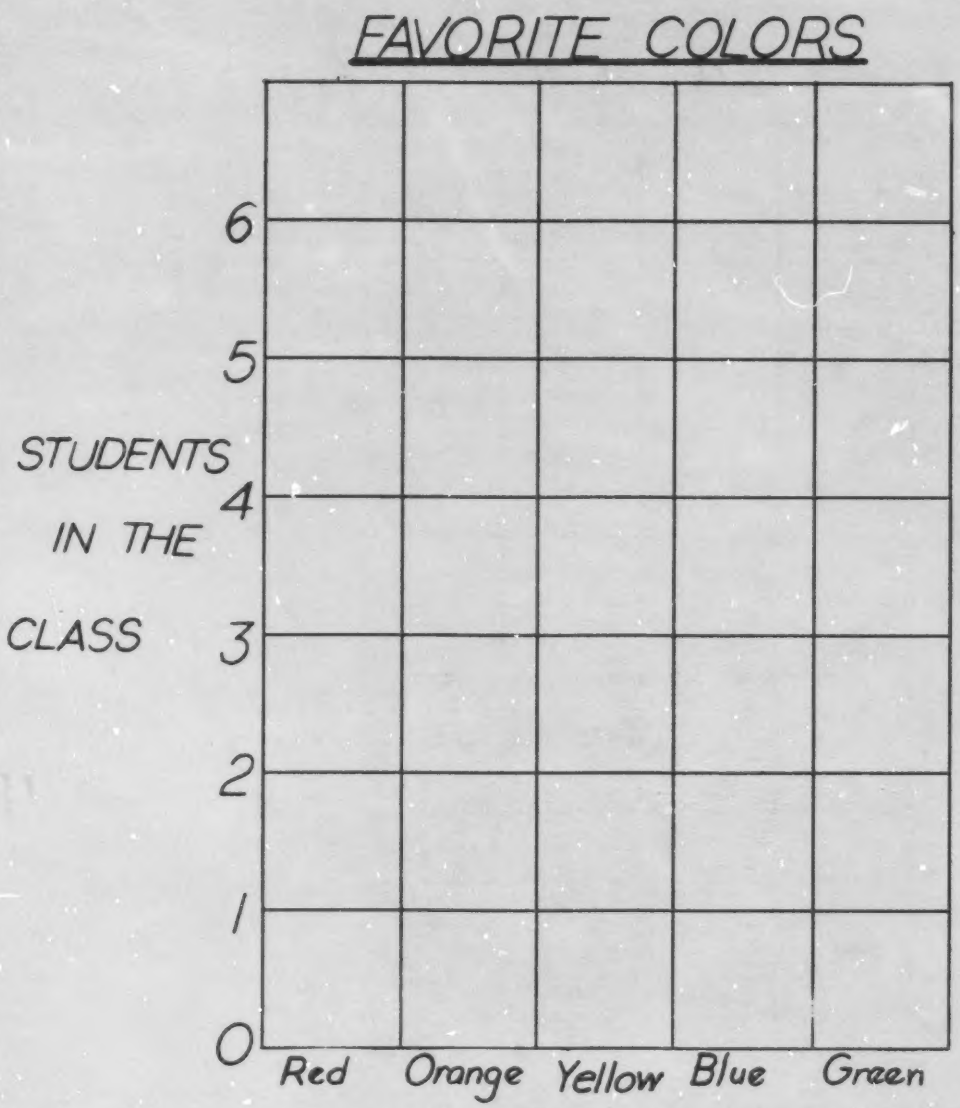


1. How many students have brown eyes? _____
2. Which two colors have the same number? _____, _____
3. How many students have blue eyes? _____
4. How many students have hazel eyes? _____
5. Which color do most students have? _____

P.O. 3.12.01.02

NAME:_____ CLASS:_____ DATE:_____

Use the information given and construct a bar graph.



RED- 3 students
ORANGE - 1 student
YELLOW - 4 students
BLUE - 2 students
GREEN - 1 student

3.04.01 THE IDENTITY ELEMENT (1) FOR MULTIPLICATION AND THE ROLE OF ZERO

(1 lesson)

PERFORMANCE OBJECTIVES

The student will be able to...

3.04.01.01A recognize 1 (one) as the identity element in multiplication;
e.g.,

3 x 1 = 3	1 x 3 = 3
5 x 1 = 5	1 x 5 = 5

3.04.01.02A find the product when 0 (zero) is a factor.
e.g.,

2 x 0 = 0	0 x 2 = 0
4 x 0 = 0	0 x 4 = 0

3.04.01

VOCABULARY

TERMS

zero
identify element
product

GETTING STARTED

Prepare 10 paper cups and a bag of marbles.

Display three (3) empty cups in the front of the room. Say, "How many cups do you see?" Place one (1) marble in each cup. Say, "How many marbles did I put in each cup? How many marbles did I use in all?" Empty the cups. Repeat this procedure using different numbers of marbles.

Prepare and distribute 3 x 3 grids with some entries along the side and top of each.
e.g.,

X	2	3
5		
4		

Make each grid different. Ask the students to fill in the empty spaces by multiplying.
e.g.,

X	2	3
5	10	15
4	8	12

Ask the students to change papers with their neighbors and ask the neighbor to check the multiplication.

3.04.01

3.04.01.01 to recognize 1 (one) as the identity element in multiplication

STRATEGY 1: Prepare 10 paper plates and a box of cookies or discs. Display three (3) empty plates in front of the room. Say, "How many plates do you see?" (3)

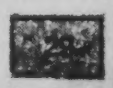
Place one (1) cookie or one (1) disc on each sheet. Say, "How many cookies did I put in each plate? (1) How many cookies did I use in all?" (3) Ask what number sentence could be written to represent the process. Elicit 3 x 1 = 3.

Repeat this procedure using other numbers, but always putting one (1) cookie or disc on each plate. Say that when any number is multiplied by 1 the product is the same number. Say, "1 is called the identity element."

STRATEGY 2: Prepare and distribute to each child 10 plastic chips and 1 paper cup. Say, "How many paper cups do you have? (1) Put 5 chips in the cup. How many chips are in the cup? (5) How many chips in all? (5)"

Ask the students to write a number sentence for the demonstration, e.g., 1 x 5 = 5.

Ask the students to empty the cups. Repeat the above procedure using different numbers of chips. Say that one group of any number equals that number or a number multiplied by one always is equal to itself. Explain that this is called the identity element.



3.04.01

3.04.01.02 find the product when 0 (zero) is a factor

STRATEGY 1: Prepare a set of large blank index cards.

Display two (2) cards. Say, "How many cards am I holding? (2) How many butterflies are on this card? (0) How many butterflies are there altogether?" (0) Ask what number sentence can be written to represent this demonstration. Elicit 2 x 0 = 0. Repeat procedure using other numbers and objects, e.g., candies, cars.

Say that when multiplying by zero the answer is always zero.

STRATEGY 2: Write on the chalkboard 5 x 0 = ☐ and 3 x 0 = ☐ .

Ask individual students to come to the chalkboard to write the answers. Say, "What rule can we see from these examples?" Elicit that when any number is multiplied by zero the answer is always zero. Say, "When zero is the first factor in the number sentence, the answer is also zero."
e.g.,

0 x 5 = 0.

Ask the students to write a related multiplication sentence for each sentence on the chalkboard.
e.g.,

5 x 0 = ☐ relates to 0 x 5 = ☐ , ...

P.O. 3.04.01.01

NAME:_____ CLASS:_____ DATE:_____

Directions: 1. Answer each number sentence below.
2. Solve each problem.

Remember: When you multiply any number by 1, the answer will always be the same number.

5 plates. There is 1 cookie on each plate.
5 x 1 = 5

Answer each number sentence below.

5 x 1 = ☐	20 x 1 = ☐	1 x 6 = ☐
2 x 1 = ☐	14 x 1 = ☐	1 x 10 = ☐
3 x 1 = ☐	25 x 1 = ☐	1 x 27 = ☐
8 x 1 = ☐	39 x 1 = ☐	1 x 50 = ☐
10 x 1 = ☐	100 x 1 = ☐	1 x 275 = ☐

Solve this problem. Show all work. There 32 cups. Each cup has one marble. How many marbles in all?

P.O. 3.04.01.02

NAME: _____ CLASS: _____ DATE: _____

1. Answer each number sentence below.
2. Solve eacn problem.
3. Try these.

Remember: When you multiply any number by Zero the answer is always 0.

Example: 5 x 0 = 0 or 0 x 5 = 0

Answer each number sentence below.

Answer each number sentence below.

3 x 0 =	6 x 0 =	125 x 0 =
1 x 0 =	8 x 0 =	1,000 x 0 =
25 x 0 =	47 x 0 =	0 x 0 =

Solve each problem.

1. There are 32 empty coffee cups. How many ounces of coffee in all? _____

2. There are 87 empty cookie jars on the shelf in Macy's? How many cookies in all? _____

3.04.02 MULTIPLICATION FACTS

(2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.04.02.01A state multiplication facts by filling in the blanks in a multiplication table;
e.g.,

x	0	1	2	3	4	5
0			0			
1			2			
2	0	2	4	6	8	10
3			6			
4			8			
5			10			

3.04.02.02A write multiplication facts for numbers 1 through 5 in horizontal and vertical format;
e.g.,

$$\begin{array}{r} 2 \\ \times 5 \\ \hline 10 \end{array} \qquad 5 \times 2 = 10$$

3.04.02.03A use the commutative property of multiplication.
e.g.,

$$5 \times 2 = 2 \times 5$$

3.04.02

VOCABULARY

TERMS

rectangular array
commutative property
horizontal
vertical

GETTING STARTED

Distribute 25 discs to each student. Starting with one group of two, ask the students to make five piles of two. Ask them to count one pile, and record on the chalkboard.

e.g.,

1 group of two = 2

2 groups of two = 4

Repeat this procedure of grouping, counting and recording by twos, threes, and fives. Record what the students do, adding the multiplication example.

e.g.,

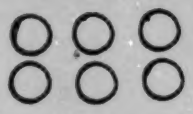
2 groups of four = 2 fours = $\begin{array}{r} 4 \\ \times 2 \\ \hline \end{array}$

Prepare and distribute graph paper to each student. Ask the students to write a counting number in each box starting with 1 and ending at 50. Ask a student to count aloud by twos and ask the students to circle each number as it is said. Repeat this procedure for threes, fours and fives.

3.04.02

3.04.02.01 state multiplication facts by filling in the blanks in a multiplication table

STRATEGY 1: Form arrays using magnetic discs on the chalkboard.
e.g.,



Say, "What is the number of rows in the array? (2) What is the number of objects in each row? (3) What is the number of objects in the entire array?" (6) Elicit from the students that 2 rows of three = 6, 2 threes = 6, 3 x 2 = 6.

Form arrays for several different multiplication facts, e.g., 5 x 2, 2 x 4, 3 x 4.

STRATEGY 2: Draw a large blank multiplication chart on the chalkboard. Duplicate blank charts for each student. Elicit from the students the facts for zero and one. Fill in the chart for these facts. Ask the students to do the same. Elicit facts for 2 by counting. The rest may be derived by repeated addition. Continue filling in the chart using students' answers. Point out the developing patterns in the columns and rows.

3.04.02.02 write multiplication facts for numbers 1 through 5 in horizontal and vertical format

STRATEGY 1: Review multiplication as repeated addition. Write the examples on the chalkboard vertically and horizontally.

3.04.02

STRATEGY 1: cont'd

e.g.,

$3 + 3 + 3 + 3 + 3 = 15$

$$\begin{array}{r} 3 \\ 3 \\ 3 \\ 3 \\ +3 \\ \hline 15 \end{array}$$

Say that the product is the same in either example, therefore, multiplication facts can be written both ways.

e.g.,

$5 \times 3 = 15$

$$\begin{array}{r} 3 \\ \times 5 \\ \hline 15 \end{array}$$

STRATEGY 2: Say to the students that multiplication examples may be written in two ways, horizontally or vertically. Both ways are correct. Regardless of the format written, the answer is still the same.

e.g.,

$3 \times 5 = 15$ or $\begin{array}{r} 3 \\ \times 5 \\ \hline 15 \end{array}$

Repeat this procedure using other examples.

3.04.02.03 **use the commutative property of multiplication**

STRATEGY 1: Construct an array of 5 threes on a paper mat, using beads, discs, chips or beans. Say, "How many discs are there in each row? (3) How many rows are there? (5) How many discs in all? (15) What multiplication sentence does this array show?"

Elicit from students that $5 \times 3 = 15$.

Repeat this procedure using other examples.

STRATEGY 2: Prepare and distribute to each student 15 bottle caps. Tell the students to make a design of columns and rows, using all the bottle caps. Call on several students to demonstrate their arrays at the chalkboard. Elicit from the students that they all made 5 rows of 3, or 3 rows of 5. Write 5 x 3 = 3 x 5. Say, "Does the answer change if the arrangement of factors change?"

Repeat this proceudre using other bottle caps and arrays.

P.O. 3.04.02.01

NAME: _____ CLASS: _____ DATE: _____

Directions: Complete the multiplication table.

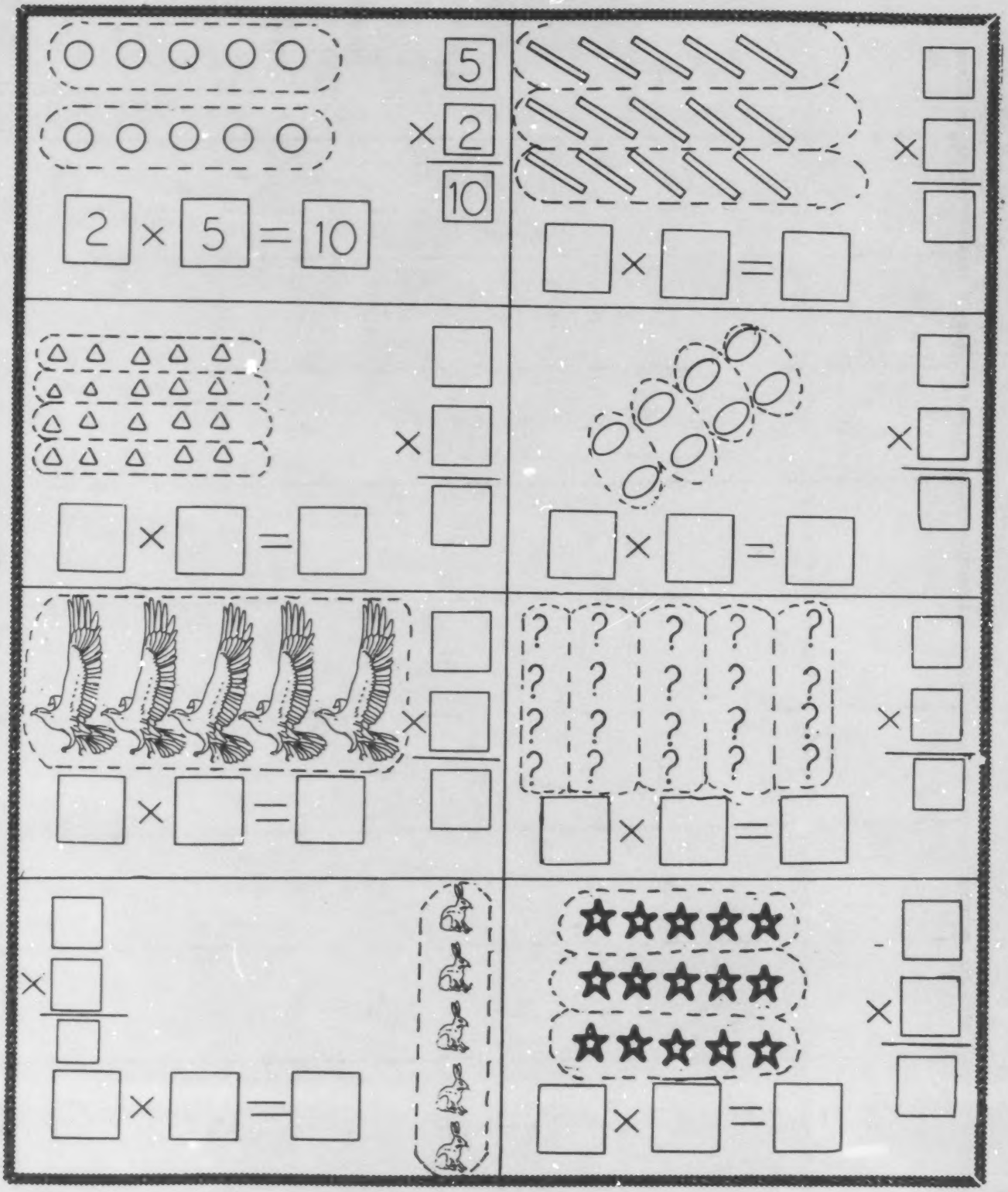
X	0	1	2	3	4	5
0						0
1				3		
2			4			
3				9		
4		4				
5					20	

57

P.O. 3.04.02.02

NAME: _____ CLASS: _____ DATE: _____

Write two examples for each picture.



P.O. 3.04.02.03

NAME: _____ CLASS: _____ DATE: _____

Fill in each box.

1	$4 \times 3 = \square \times 4$
2	$2 \times \square = 3 \times 2$
3	$5 \times \square = 0 \times 5$
4	$\square \times 1 = 1 \times 3$
5	$2 \times 1 = \square \times \square$
6	$\square \times 5 = 5 \times 1$
7	$4 \times 2 = 2 \times \square$
8	$3 \times 5 = 5 \times \square$
9	$\square \times 4 = 4 \times 5$
10	$5 \times \square = 2 \times 5$

3.05.01 CONCEPTS OF DIVISION

(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.05.01.01A demonstrate that the division process may be regarded as repeated subtraction of the same number;
e.g.,

```
2) 8
  -2 1   two
   6
  -2 1   two
   4
  -2 1   two
   2
  -2 1   two
   0 4   twos
```

3.05.01.02A recognize that dividing by a number is the inverse operation of multiplying by that number;
e.g.,

$8 \div 2 = 4$ $\quad$ $4 \times 2 = 8$

starting number $\quad$ ending number

3.05.01.03B demonstrate various ways to write a division example.
e.g.,

$2\overline{)8}$ $\quad$ $\frac{8}{2}$ $\quad$ $8 \div 2 =$

3.05.01

VOCABULARY

TERMS	**SYMBOLS**
division	$\overline{)}$, ÷, —
divisor	
dividend	
quotient	
inverse operation	

GETTING STARTED

Ask nine (9) students to come to the front of the room. Instruct the students to form groups of 3. Say, "How many groups of 3 do we have?" Elicit from the students that three groups of 3 were formed by the original nine (9) children. Say, "We have just divided the nine (9) students into three (3) equal groups. When we do this activity in mathematics, we call the procedure, division. When we divided the number 9 into 3 groups, we found the number in each group was 3. Repeat this procedure using other basic division facts. Make sure to use students or concrete objects to insure understanding of the basic concept of division.

Prepare a large supply of colored discs or chips. Say that each student will be getting the same number of chips. After all the chips have been distributed, ask a student how many chips he/she has received. Ask several other students. Say to the class that the total amount of chips was divided evenly among all the students and each student was able to receive 2 chips. Collect the chips from the students. Place 4 chips at the front of the room. Say, "How many groups can we make with 2 chips in each group?" Ask a student to form 2 groups of two. Say, "We divided the four chips into 2 equal groups. Each group has 2 chips."

Divide the class into small groups. Distribute at least 10 chips to each group. Repeat the above procedure using other division facts. Students should work as a group to determine the correct responses.

3.05.01

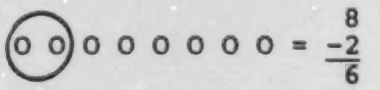
3.05.01.01 **demonstrate that the division process may be regarded as repeated subtraction of the same number**

STRATEGY 1: Display a group of 6 blocks at the front of the room. Write the number 6 on the chalkboard. Remove 2 blocks. Write $\begin{array}{r} 6 \\ -2 \\ \hline 4 \end{array}$. Continue removing the blocks 2 at a time, until there aren't any blocks left. Each time you remove blocks, subtract.

e.g., $\begin{array}{r} 6 \\ -2 \\ \hline 4 \\ -2 \\ \hline 2 \\ -2 \\ \hline 0 \end{array}$

Say, "How many times have 2 blocks been removed?" Elicit three (3) times. Write 6 ÷ 2 = 3 on the chalkboard. Say that 6 represents the number of blocks to be divided, 2 represents the number in each group and 3 represents the number of subtractions. Ask students to draw eight (8) circles in their notebooks. Ask them to write the number 8 next to their drawing. Instruct the students to draw a circle around 2 circles and to subtract 2 from the number 8.

e.g.,



$= \begin{array}{r} 8 \\ -2 \\ \hline 6 \end{array}$

Ask the students to continue this procedure until all of the circles have been used. Count, with the class, the number of O (circles) that were encircled (subtracted). Write the corresponding division sentence on the chalkboard, e.g., 8 ÷ 2 = 4. Repeat this procedure with other basic division fact examples that can be solved using repeated subtraction.

STRATEGY 2: Prepare several magnetic circular discs. Display a group of nine (9) magnetic discs on the chalkboard. Write the sentence $9 \div 3 = \square$. Ask a student to pull a group of three discs away from the 9. Ask the same student to subtract 3 from 9. Repeat this procedure until all of the discs are used. Write the following on the chalkboard.

$$\begin{array}{ll} & 9 \\ \text{(1 group)} & -3 \\ & \hline & 6 \\ \text{(1 group)} & -3 \\ & \hline & 3 \\ \text{(1 group)} & -3 \\ & \hline & 0 \end{array}$$

Say, "How many groups of three (3) did we form from the nine (9) discs?" Elicit that three (3) groups were formed. Ask the students to write a division sentence to represent this demonstration. Elicit $9 \div 3 = 3$. Say that the nine (9) represents the number of discs started with, the three (3) represents the number of discs there are in each group, and the final three represents the number of groups of three (3) they were able to form. Ask the students to copy the repeated subtraction example and division sentence in their notebooks. Repeat this procedure with other division facts that can be computed using repeated subtraction.

3.05.01.02 recognize that dividing by a number is the inverse operation of multiplying by that number

STRATEGY 1: Say to the students that subtraction is the inverse operation of addition, e.g., $5 + 3 = 8$ is the inverse of $8 - 3 = 5$. Write a few other examples

STRATEGY 1: cont'd

illustrating this fact. Say to the students that the same way that subtraction is the inverse of addition, division is the inverse of multiplication. Instruct each student to fold a paper in half, and to write the headings Division and Multiplication at the top of each half. Write the following example under the Division heading.

Division	Multiplication
6 ÷ 3 = 2	2 x 3 = 6
o o o	o o o
o o o	o o o

Instruct each student to draw six (6) circles on a paper, with three (3) circles in each group. Say, "How many groups of three (3) were formed?" Place the number 2 in the box to complete the open sentence. Instruct the students to draw two (2) rows of circles with each row containing three (3) circles. This diagram should appear under the Multiplication heading. Ask the students to look at the two examples, 6 ÷ 3 = 2 and 2 x 3 = 6. Say, "What is the same about these two (2) examples? What is different about these examples?" If students have difficulty, show them that the order is different. In a division example, the largest number is the starting number; and in a multiplication example the ending number is the largest example.

e.g.,

6 ÷ 3 = 2 (starting number)

2 x 3 = 6 (ending number)

Repeat this procedure with other basic division examples showing their relationship to the inverse operation of multiplication.

3.05.01

STRATEGY 2: Say, "Mr. Multiplication and Mr. Division are very good friends. They like to do almost everything together. Mr. Multiplication and Mr. Division decided to work together. They became partners and promised they would help each other whenever they could."

Place the following headings at the chalkboard, Mr. Multiplication and Mr. Division. Write the following example under the division title, $4 \div 2 = 2$. Say, "Mr. Division says that $4 \div 2 = 2$. Mr. Multiplication, wanting to help his friend, says $2 \times 2 = 4$." Explain that the position of the numbers is different but the same numbers can be used to formulate both division and multiplication examples. Complete both columns at the chalkboard with other examples. Always begin with "Mr. Division says... or Mr. Multiplication says...," and have students write the corresponding multiplication or division examples to the one which you have given them.

3.05.01.03 **demonstrate various ways to write a division example**

STRATEGY 1: Write the following example on the chalkboard, $8 \div 2 = 4$. Say that this example represents division and that the same division example can be written in two other ways. Write the other forms on the chalkboard next to the first.

e.g.,

$$8 \div 2 = 4 \qquad 2\overline{)8}^{\,4} \qquad \frac{8}{2} = 4$$

Incorporate the terms divisor, dividend and quotient in your explanation. Label each part of each example with

STRATEGY 1: cont'd

the correct term. Continue this procedure using other division examples. Show the students one form of the example and have them write the other two forms. Continue while asking the following questions, "Which number is the dividend? Which number is the divisor? Which number is the quotient?"

STRATEGY 2:

Say, "How many different ways can we write the number 5?" Write the responses on the chalkboard.
e.g.,

5, $\cancel{\text{HH}}$, V, $\frac{25}{5}$, 1 x 5...

Say that in the same way numbers can be written in different forms, so too can a division example. Write on the chalkboard, 6 ÷ 3 = 2. Label each part of the example, <u>dividend</u>, <u>divisor</u> and <u>quotient</u>. Write the other forms for the division example already on the chalkboard.
e.g.,

$3\overline{)6}^{\,2}$, $\frac{6}{3} = 2$

Label where the dividend, divisor and quotient appear in the other forms of a division example. Write 18 ÷ 3 = 6. Ask a student to write the different forms for this division example. Ask the students to identify each part as being the dividend, divisor or quotient. Repeat this procedure with other division examples.

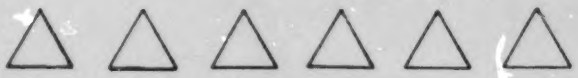
P.O. 3.05.01.01

NAME: _____ CLASS: _____ DATE: _____

Circle each group to be subtracted.

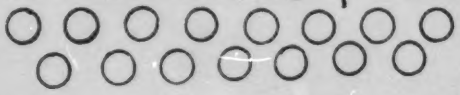
Find $6 \div 2 =$ ☐

How many groups of 2 can be subtracted from 6?



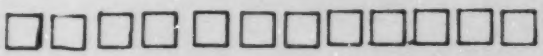
Find $15 \div 5 =$ ☐

How many groups of 5 can be subtracted from 15?



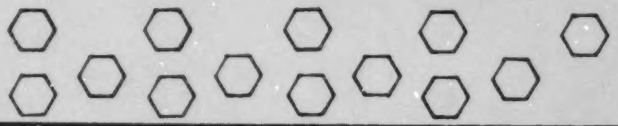
Find $12 \div 3 =$ ☐

How many groups of 3 can be subtracted from 12?



Find $14 \div 2 =$ ☐

How many groups of 2 can be subtracted from 14?

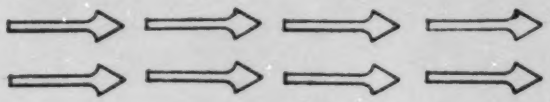


Find $10 \div 2 =$ ☐

How many groups of 2 can be subtracted from 10?

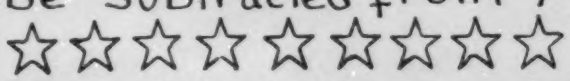
Find $8 \div 2 =$ ☐

How many groups of 2 can be subtracted from 8?



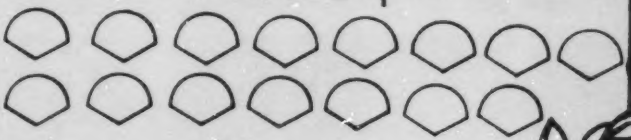
Find $9 \div 3 =$ ☐

How many groups of 3 can be subtracted from 9?



Find $15 \div 3 =$ ☐

How many groups of 3 can be subtracted from 15?



P.O. 3.05.01.02

NAME: _____ CLASS: _____ DATE: _____

Fill in the blanks.

8 ÷ 2 = 4	4 x 2 = 8
10 ÷ 2 = ☐	☐ x 2 = 10
9 ÷ 3 = ☐	3 x ☐ = 9
15 ÷ 3 = ☐	☐ x 3 = 15
12 ÷ 6 = ☐	☐ x 6 = 12
12 ÷ 4 = ☐	3 x 4 = ☐
16 ÷ 8 = ☐	☐ x 8 = 16
14 ÷ 2 = ☐	7 x 2 = ☐
20 ÷ 5 = ☐	☐ x 5 = 20
15 ÷ 5 = ☐	3 x ☐ = 15

P.O. 3.05.01.03

NAME:_____ CLASS:_____ DATE:_____

Complete each example by filling in the missing numbers.

$6 \div 2 = \square$	$\square \overline{)6}^{3}$	$\frac{\square}{2} = 3$	$8 \div \square = 2$
$2\overline{)\square}^{4}$	$\frac{8}{2} = \square$	$2 \div 2 = \square$	$2\overline{)2}^{\square}$
$\frac{2}{\square} = 1$	$4 \div \square = 2$	$\square \overline{)4}^{2}$	$\frac{\square}{2} = 2$
$10 \div 5 = \square$	$5\overline{)\square}^{2}$	$\frac{10}{5} = \square$	$\square \div 3 = 2$

3.10.02 MEASUREMENT - TIME

(2-3 lessons)

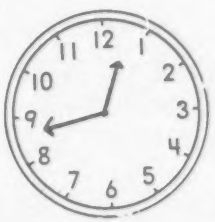
PERFORMANCE OBJECTIVES

The student will be able to...

3.10.02.01B tell time in five minute intervals;
e.g.,

5:05

3.10.02.02B tell time by minute intervals (before, to, of the hour);
e.g.,



18 minutes before 1 o'clock.
18 minutes to 1 o'clock.
18 minutes of 1.

3.10.02.03A tell and record the time using A.M. and P.M.;
e.g.,

9:15 in the morning = 9:15 A.M.
6:45 in the evening = 6:45 P.M.

3.10.02.04B solve story problems related to skills learned in this module.
e.g.,

Jan leaves her house at 8:05 A.M. Bill leaves his house at 8:46 A.M. How many minutes earlier did Jan leave than Bill?

8:05

8:46

3.10.02

VOCABULARY

TERMS

A.M.
P.M.

GETTING STARTED

Prepare and distribute to each student a small clock with moveable hands. Display a large clock with moveable hands. Say, "What do the hands tell us?" Elicit that the long hand is the minute hand and the short hand is the hour hand. Say, "How long does it take to move around the clock?"

Ask the students to show 3:00, 2:30, 8:30, 12:00, 9:15, 6:45 on their clocks.

Prepare for each student a rexograph of a television listing, real or a facsimile. Say, "What is a schedule? Why are schedules useful? Who uses them?" Distribute the television schedules, and ask several questions to stimulate a discussion.
e.g.,

1. What time does the news go on? When does it end?
2. How long is "The Muppet Show?"
3. How many shows can you watch on Channel 2 between 8:00 and 10:00? Channel 4?
4. If you watched X show and Y show, how much time did you spend watching television?

3.10.02

3.10.02.01 tell time in five minute intervals

STRATEGY 1: Prepare a classroom clock with moveable hands and a clock for each student, e.g., a paper plate with 2 paper hands and a paper fastener or a commercial small clock. Ask a student to count by fives until 60. Write the numbers on the chalkboard. Say, "When the minute hand is on the 3 and the hour hand is on the 8, what time is it? Look at the numbers on the chalkboard. What does three 5s equal?" Elicit 15. Say, "The time is 8:15."

Repeat this procedure using other examples. Say that when the minute hand reaches 12, the hour changes.

STRATEGY 2: Draw a clock on the chalkboard.
e.g.

Ask a student to recite the 5 times table. Then ask another student to label the outside of the clock as done above. Say, "When the hour hand is on the 8 and the minute hand is on the 1, it's 8:05 or 5 minutes after 8." Ask the students to demonstrate 9:05, 12:35, 7:25 on their clocks. Repeat this procedure using other examples.

3.10.02

3.10.02.02 tell time by minute intervals (before, to, of the hour)

STRATEGY 1: Display a classroom clock with moveable hands. Display 8:30 on clock. Ask "What time does the clock say? Where is the long hand? How much time has passed since 8:00? The 6 is a very important number on the clock. It divides the clock in half. It is half past 8 or half an hour away from 9:00." Draw a clock on the chalkboard.
e.g.,

Say that when the big hand is on the 6, the small hand isn't exactly on 8, it's in between the 8 and the 9. Say, "Now we are getting closer to 9:00. When the big hand moves to 7, how many minutes is it until 9:00?" Elicit 25 minutes to 9. Repeat for 8, 9, 10 and 11. Display other times. Ask the students to read the times as you display them.
e.g.,

7:55, 2:36, 4:28, 12:09.

STRATEGY 2: Display a digital clock and a classroom clock with moveable hands. Show various times on the digital clock. Ask the students to display each time on a regular clock. Display 8:30 on a digital clock. Say, "What time has passed since 8:00? How long is it until 9:00? It's hard to tell on this clock, but on the traditional clock you can see clearly

STRATEGY 2: cont'd

that we are 30 minutes away from 9:00 when the big hand is on the 6. Still we say 8:30. When the big hand moves to the 7 we say that it is 25 minutes to 9. How many minutes till 9 is it when the big hand is on the 8? the 10? the 11?"

Repeat this procedure using other before the hour examples. The students should demonstrate the equivalent times on the digital clock, e.g., 9:35, 9:45, 9:55.

3.10.02.03 tell and record the time using A.M. and P.M.

STRATEGY 1: Display a classroom clock with moveable hands showing 9:00. Say, "How many times can it be 9:00 in one day? When will it be 9:00 again today? When it's 9:00 in the morning we write 9:00 A.M. and 9:00 in the evening is 9:00 P.M.." Record both on the chalkboard. Ask the students to number a paper from 1 through 10. Say examples for the students to write, e.g., 2:00 in the morning. Students should record 2:00 A.M. on their papers. Repeat this procedure using other times and ask several students to write the times on the chalkboard.

STRATEGY 2: Say "What time is school over? Is school over at 3:00 in the morning or 3:00 in the afternoon?" Say that we use AM to mean before 12 in the morning and PM to mean after 12. Write the following on the chalkboard.

e.g.,

A.M. = in the morning

P.M. = in the afternoon or evening

Ask several students to say the time of day in which particular activites are done, using A.M. and

STRATEGY 2: cont'd

P.M. e.g., wake up, leave school, do homework, eat dinner, watch television, take a bath. Ask several students to demonstrate the time on a classroom clock.

3.10.02.04 solve story problems related to skills in this module

STRATEGY 1:

State problem solving strategies and record them on chalkboard for students to copy as follows:

1. READ the problem carefully.
2. CHOOSE important facts. (numbers, question)
3. WRITE a number sentence.
4. ESTIMATE your answer.
5. ANSWER the number sentence.
6. LABEL the answer to the problem.

Write a problem on a transparency or the chalkboard, e.g. Jan leaves her house at 8:05 A.M. Bill leaves his house at 8:46 A.M. How many minutes earlier did Jan leave than Bill? Use a clock face to help the students find the answer. Repeat using other time problems.

STRATEGY 2:

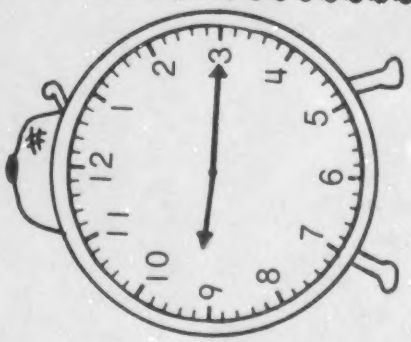
On the chalkboard write a train schedule. You can use a subway schedule or AMTRAK. The problems that follow will be based on the schedule. Discuss what a schedule is and how it's used. Also discuss other uses for schedules by asking questions.
e.g.,

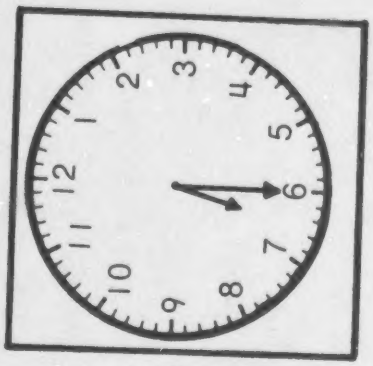
1. How many minutes between x stop and y stop?
2. How much longer is the ride from x to y at 9:00 P.M. than 9:00 A.M.?
3. If the train is delayed at x for 15 minutes, what time will you get to y?

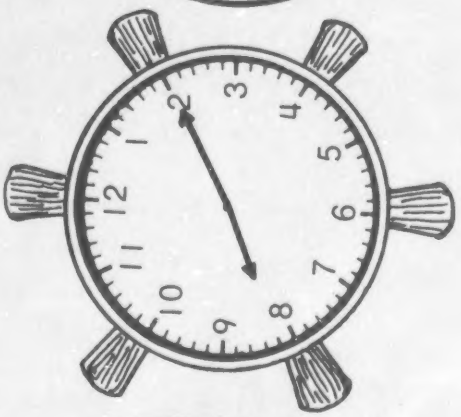
P.O. 3.10.02.01

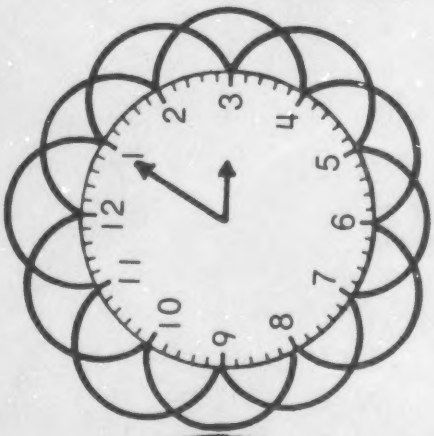
NAME: _____ CLASS: _____ DATE: _____

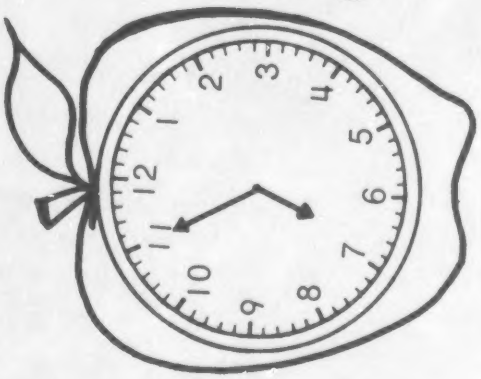
1. Write the time under each clock.
2. Put hands on each clock below to show the correct time.

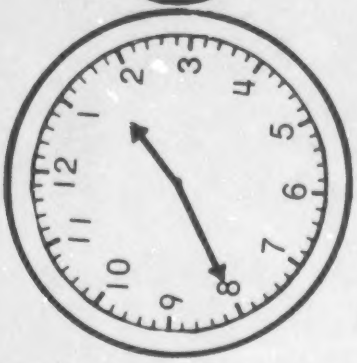


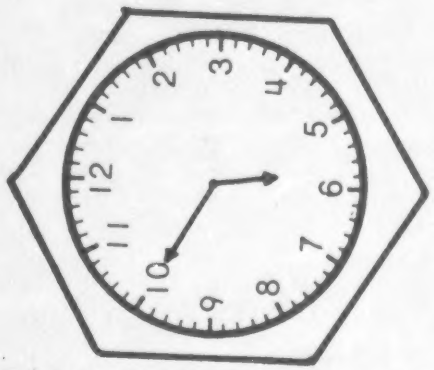












78

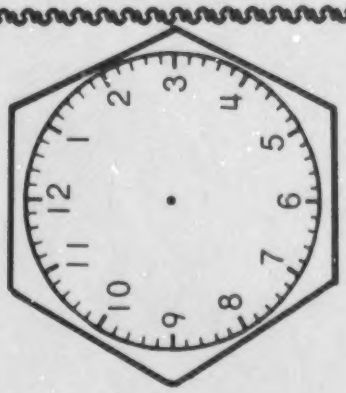
77

58

P.O. 3.10.02.01

NAME:_____ CLASS:_____ DATE:_____

1. Write the time under each clock.
2. Put hands on each clock below to show the correct time.



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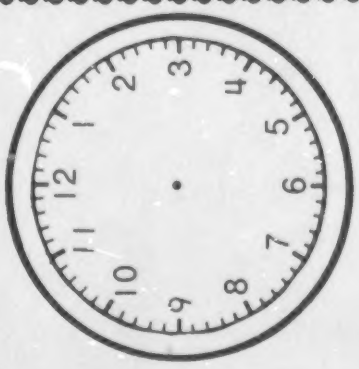

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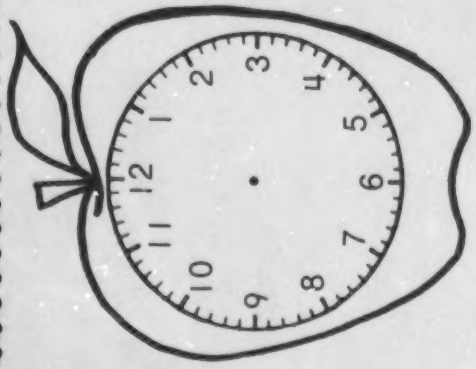
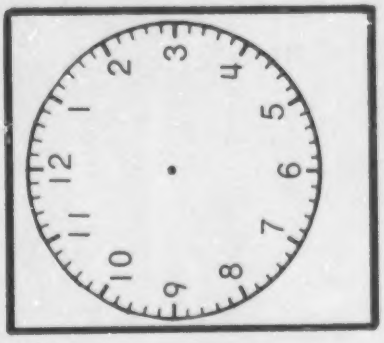
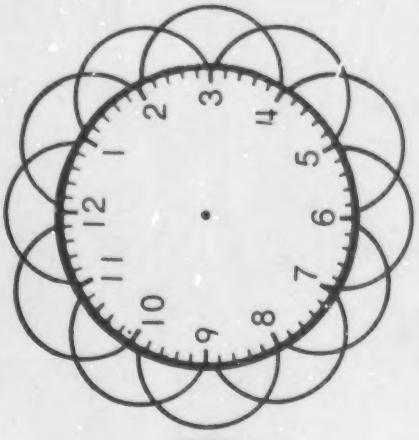


11:45



1:25

10:20



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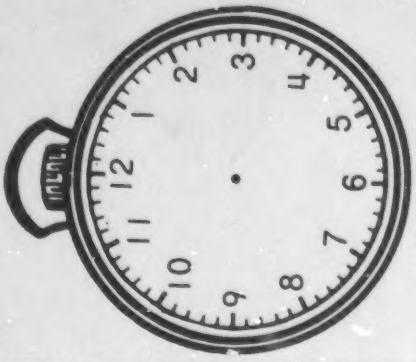
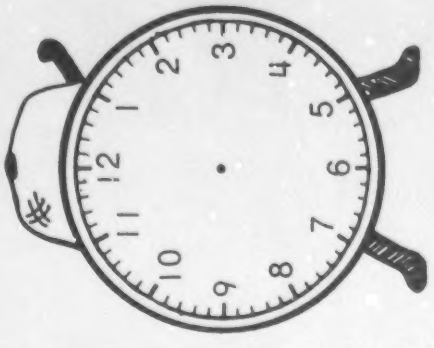


9:05



10:10

80

79

P.O. 3.10.02.02

NAME:_____ CLASS:_____ DATE:_____

Fill in the blanks under each clock.

10 minutes to 3

___ minutes to ___

___ minutes to ___

___ minutes to ___

___ minutes to ___

___ minutes to ___

___ minutes to ___

___ minutes to ___

___ minutes to ___

P.O. 3.10.02.03

NAME: _____ CLASS: _____ DATE: _____

Read the list of duties and fit them into a schedule in the form at the bottom of the page.

Saturday or Sunday

A.M.	TIME	P.M.	TIME
Make bed and clean room	15 minutes	Eat lunch	1 hour
Eat breakfast	30 minutes	Free time	2 hours
Take shower and dress	30 minutes	Study	2 hours 45 minutes
Deliver newspapers	2 hours 15 minutes	Clean yard	30 minutes

	A.M. TIME	ACTIVITY
	8:00	
P.M.		

P.O. 3.10.02.04

NAME:_____ CLASS:_____ DATE:_____

Read and solve each problem below. Use a clock.

	Answer Column
Jane left school at 3:00 p.m. She has 1 hour and 30 minutes until the volleyball game. What time is the volleyball game?	
Joe ate lunch at 12:30 p.m. He left to go to the movies 2 hours and 45 minutes later. What time did the movie begin?	
Mr. Smith began painting at 1:40 He finished at 4:30 How long did he work.	
David has a guitar lesson at 11:15 Saturday morning. His lesson is 45 minutes. What time will he finish his lesson?	
Ruth arrived at the bus stop at 8:20 She waited for 15 minutes. What time did the bus arrive?	
The morning train leaves the station at 7:45. If you arrive at 6:50, How long will you wait for the train?	

3.06.01 EQUIVALENT FRACTIONS

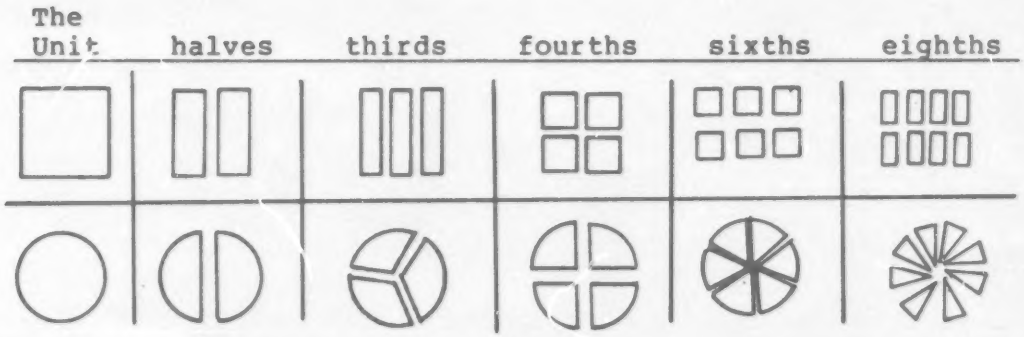
(3-4 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.06.01.01A identify and record the total number of parts to equal one whole (halves, thirds, fourths, sixths, and eighths);
e.g.,

NUMBER OF PARTS FOR...

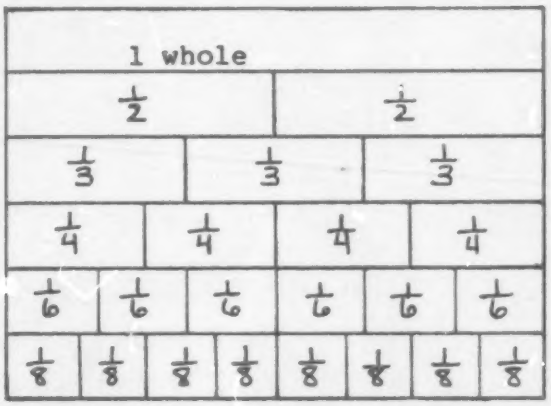


3.06.01.02A identify and define the numerator and denominator in a given fraction;
e.g.,

$\frac{2}{5}$ <— numerator
<— denominator

3.06.01.03A compare relationships between fractional parts of halves, thirds, fourths, sixths and eighths;

e.g.,



3.06.01.04A compare and order like fractions;

e.g.,

$$\frac{5}{8} > \frac{2}{8}$$

$$\frac{2}{8} \quad \frac{5}{8}$$

3.06.01.05A compare and order unlike fractions.

e.g.,

$$\frac{1}{10} < \frac{1}{6}$$

$$\frac{1}{10}, \frac{1}{6}$$

3.06.01

VOCABULARY

TERMS	**SYMBOLS**
denominator	
numerator	
fraction	
greater than	>
less than	<
like fractions	
unlike fractions	

GETTING STARTED

Ask the students to name the parts of a clock. Elicit the hands, the face, the numbers and the case, and write the list on the chalkboard, or make the pieces and construct the clock on a chart.
e.g.,

Say, "We must have all these parts together to have a complete clock."

Say, "What are the parts of a book?" Elicit the cover, the pages, the binding, the table of contents, the index and the glossary. Write them on the chalkboard or construct a book. Say, "We must have all the parts together to have a complete book."

Repeat this procedure using various examples to show that all parts together make a whole.

Distribute a piece of paper and scissors to each student. Ask each student to cut the paper into a different number of parts.

Say that to make 1 whole piece of paper we must put the parts together. It does not matter if it is cut in 2 pieces or 8 pieces, each piece is needed to complete the whole piece. Ask the students to put the pieces together to construct the whole paper.

Repeat this procedure asking the students to exchange papers.

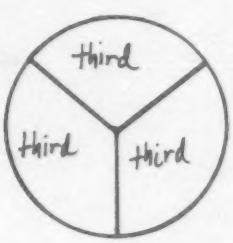
3.06.01

3.06.01.01 **identify and record the total number of parts to equal one whole (halves, thirds, fourths, sixths and eighths)**

STRATEGY 1: Using a flannel board or paper circles, display a whole circle and then two (2) halves of a circle. Say, "What shape is this? (circle) Into how many equal parts has it been cut?" (2) Record this on the chalkboard. Say that each part is called a half. e.g.,

Ask the students to copy the illustration into their notebooks. Display a circle cut into thirds. Say, "Into how many parts is the circle cut?" (3) Elicit that each part is called a third. Record this on the chalkboard.

e.g.,



Ask the students to copy the drawing into their notebooks.

Repeat this procedure for fourths, sixths and eighths.

e.g.,

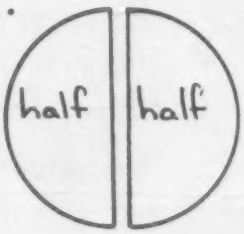
halves thirds fourths sixths eighths

3.06.01

STRATEGY 2: Use a familiar object such as an apple or a pizza pie. Cut the apple or pizza into 2 parts. Say, "Into how many parts has this been cut? (2) What do we call each piece?" Elicit a half.

On a display chart, record by drawing an illustration.

e.g.,.



Repeat this procedure for thirds, fourths, sixths and eighths.

Record each on a display board.

halves thirds fourths sixths eighths

3.06.01.02 **identify the numerator and denominator in a given fraction**

STRATEGY 1: Say, "There are 8 pieces of pizza in a pie. Adam ate three pieces. He ate $\frac{3}{8}$ of the pie."

Write the fraction $\frac{3}{8}$ on the chalkboard. Write and say the following.

$\frac{3}{8}$ → numerator
$\frac{8}{8}$ → denominator

Say, "There were eight pieces of pizza altogether so we must put an 8 as the denominator or on the bottom of the fraction. Adam ate 3 pieces so we must put a 3 as the numerator or on the top of the

STRATEGY 1: cont'd

fraction. This shows us that he ate 3 out of 8 pieces."

State another example.
e.g.,

If you cut an apple into four equal parts and ate one part, you ate $\frac{1}{4}$.

Write the fraction $\frac{1}{4}$ on the chalkboard. Say, "How many pieces were there in all?" Elicit that there were 4 pieces of apple altogether.

Say, "What number is the denominator?" Elicit 4. Say, "How many pieces did you eat?" Elicit that you ate 1 piece.

Say, "What number do we use as the numerator?" Elicit 1.

Say, "This shows us that you ate 1 out of 4 pieces."

Repeat using various examples until the students have mastered the objective.

STRATEGY 2: Write a fraction on the chalkboard, e.g., $\frac{2}{3}$. Label the numerator and denominator, $\frac{2}{3}$ numerator / denominator

Say, "The bottom number is called the denominator and shows the total number of equal parts in the whole. How many equal parts are in this whole? (3 parts) The top number is called the numerator and shows the specific number of parts of the whole. How many parts of the whole are we showing?" (2) Display $\frac{2}{3}$ in flannel board pieces.
e.g.,

Use flash cards with different fractions on each. Ask a student to read the fraction and say which

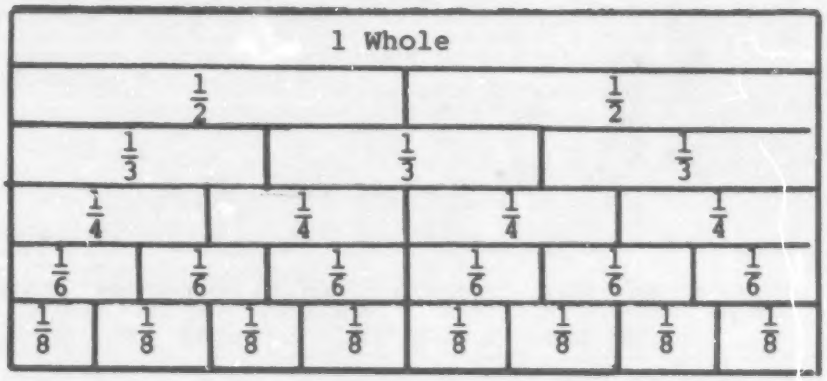
STRATEGY 2: cont'd

number is the numerator and which number is the denominator. Ask another student to identify the meaning of each.

Repeat this procedure with the class several times.

3.06.01.03 **compare relationships between fractional parts of halves, thirds, fourths, sixths and eighths**

STRATEGY 1: Make a display board.



Ask various students to come to the display and point out the answers to the following questions.

Which is the smallest fraction?

Which is the largest fraction?

If you put two sixths together, what fraction is the same?

If you cut $\frac{1}{4}$ into 2 equal parts, what fraction is the same?

If you put two halves together, what fraction is the same?

If you put four eighths together, what fractions are the same?

3.06.01

STRATEGY 1: cont'd

Continue asking a variety of questions related to the equivalence of fractions.

STRATEGY 2:

Cut up construction paper into halves, thirds, fourths, sixths and eighths. Make 1 set of each. Place each set in an envelope. Label each envelope with the fraction represented inside.

Distribute the envelopes to five (5) students. Ask the students to put the pieces together as they would a puzzle.

Ask the student with the halves to bring one up to the front of the room. Ask the student with the fourths to bring them up and see how many fourths fit into one half.

e.g., $\boxed{\frac{1}{4}\ \frac{1}{4}}$

Repeat this procedure using eighths, thirds.
Elicit that thirds do not fit evenly into one half.

Repeat this procedure using other fractional parts and determining their relationships.

3.06.01.04 compare and order like fractions

STRATEGY 1:

Prepare flannel board fractional pieces or make them from oaktag. Write two (2) fractions with like denominators on the chalkboard.
e.g., $\frac{4}{5}, \frac{2}{5}$.

Ask a student to pick out the pieces that match each to the fraction. Say, "Which set of pieces is larger?" Elicit $\frac{4}{5}$. Write and say, "$\frac{4}{5}$ is greater than $\frac{2}{5}$." Repeat this procedure using other pieces and fractions. Say, "Can you see a pattern in the fraction comparisons?" Elicit that the larger numerator in like fractions has the larger value.

STRATEGY 1: cont'd

Ask which fraction would be larger, $\frac{1}{9}$ or $\frac{8}{9}$?"
Elicit that $\frac{8}{9}$ is larger because 8 is larger than 1.

Say, "We can show this with a greater than or less than symbol." Draw a < or > on the chalkboard. Say, "The point ——> < always points to the smaller fraction. The open end < <—— is always open towards the larger number."

Ask a student to come to the chalkboard and put the greater than symbol between the $\frac{4}{5}$ and $\frac{2}{5}$.
e.g.,

$$\frac{4}{5} > \frac{2}{5}$$

Repeat this procedure using the other fractional comparisons.

e.g.,

$$\frac{1}{9} < \frac{8}{9}.$$

STRATEGY 2:

Make a set of flash cards with two (2) fractions having like denominators on each.
e.g.,

$\boxed{\frac{4}{5}\ \frac{2}{5}}$

Say, "If we have 2 fractions with the same denominator, the larger fraction is the one with the larger numerator."

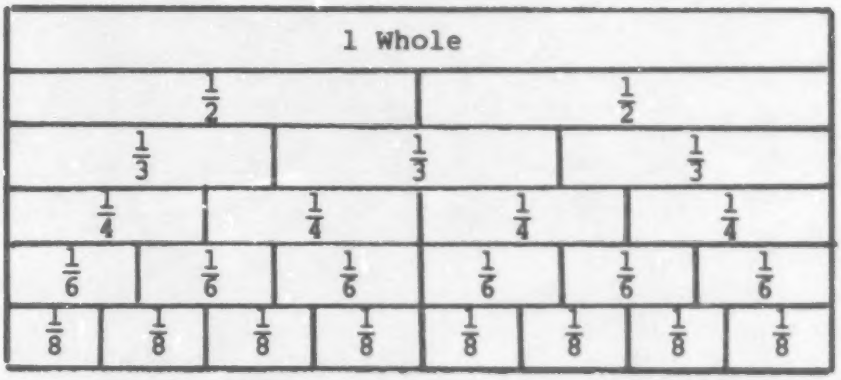
Write the symbol > on the chalkboard. Say, "The point of this symbol ——> > always points to the smaller fraction and the open end < <—— always opens toward the larger fraction."

Using the flash cards ask the students to write the two fractions into their notebooks, placing the symbol in the correct position. Ask a student to read the symbolic statement for each pair of fractions, e.g., $\frac{4}{5}$ is greater than $\frac{2}{5}$.
Continue this procedure using several flashcards.

3.06.01

3.06.01.05 **compare and order unlike fractions**

STRATEGY 1: Make a diagram.



Ask a student to tell how many fourths are equal to $\frac{1}{2}$. Elicit 2. Say, "How many eighths are equal to $\frac{1}{2}$?" Elicit 4.

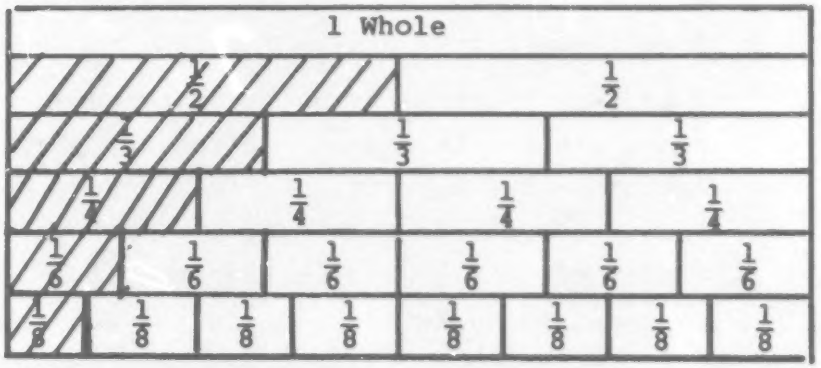
Write $\frac{1}{8} < \frac{1}{2}$. Say, "How many eighths are more than $\frac{1}{2}$?"

Elicit $\frac{5}{8}$, $\frac{6}{8}$, $\frac{7}{8}$ or $\frac{8}{8}$. Write $\frac{5}{8} > \frac{1}{2}$, $\frac{1}{2} < \frac{6}{8}$.

Repeat this procedure using various fractional comparisons.

STRATEGY 2: Prepare strips of paper with one (1) fraction colored on each strip (or use colored rods or pattern blocks).

e.g.,



STRATEGY 2: cont'd

Write $\frac{1}{2}$, $\frac{3}{4}$ on the chalkboard. Say, "Is $\frac{1}{2}$ larger or smaller than $\frac{3}{4}$?" Direct the students to use the chart, blocks, rods,.... Ask a student to write > or < symbol to make the number sentence true, e.g., $\frac{1}{2} < \frac{3}{4}$. Repeat using other fractional comparisons.

e.g.,

$\frac{2}{3}$, $\frac{4}{6}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$,...

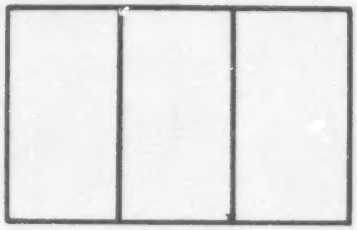
P.O. 3.06.01.01

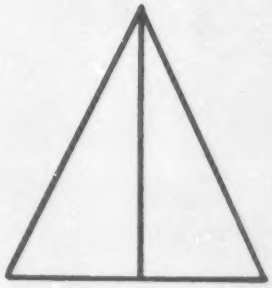
NAME: _____ CLASS: _____ DATE: _____

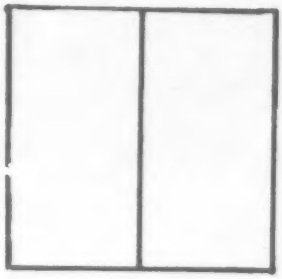
Write the number of parts in each figure.

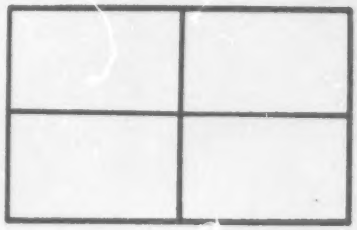
EXAMPLE

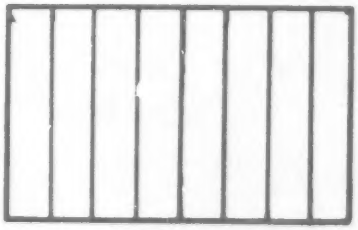
4

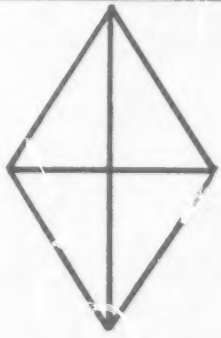


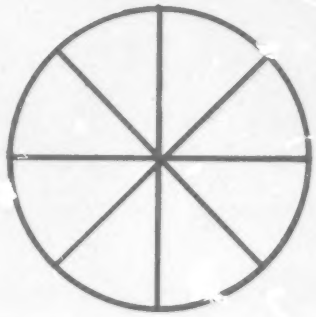










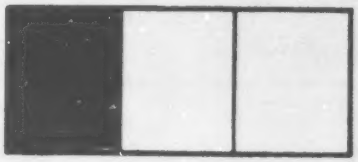


P.O. 3.06.01.02

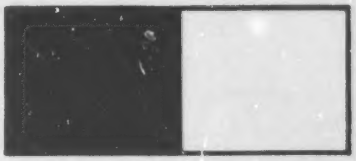
NAME: _____ CLASS: _____ DATE: _____

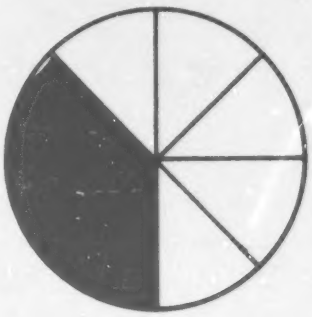
What part of the figure is shaded?

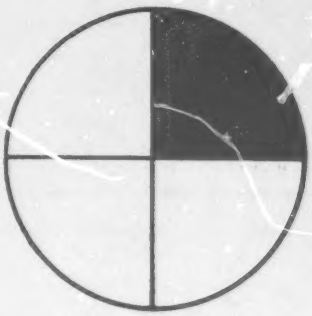
EXAMPLE

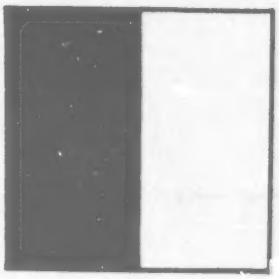


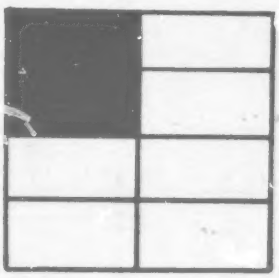
$\frac{1}{3}$

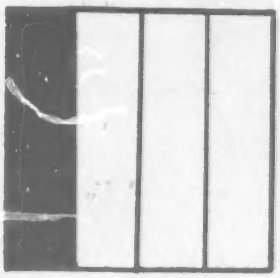








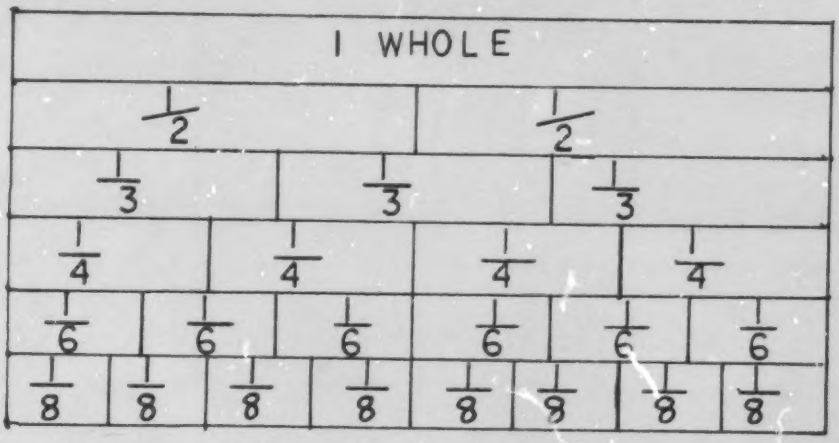




P.O. 3.06.01.03

NAME: _____ CLASS: _____ DATE: _____

COLOR THE WHOLE GREEN COLOR $\frac{1}{2}$ RED COLOR $\frac{1}{3}$ BLUE	COLOR $\frac{1}{4}$ YELLOW COLOR $\frac{1}{6}$ ORANGE COLOR $\frac{1}{8}$ BROWN



Use the pieces in the chart to fill in each box.

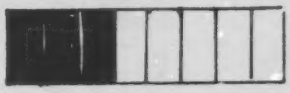
$\frac{2}{4} = \frac{\square}{2}$	$\frac{4}{8} = \frac{\square}{2}$
$\frac{2}{6} = \frac{\square}{3}$	$\frac{2}{3} = \frac{\square}{6}$
$\frac{2}{2} = \square$ WHOLE	$\frac{6}{8} = \frac{\square}{4}$

P.O. 3.06.01.04

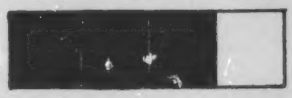
NAME: _____ CLASS: _____ DATE: _____

Write > or <

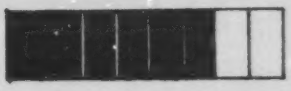
$\frac{1}{4}$ ◯ $\frac{2}{4}$



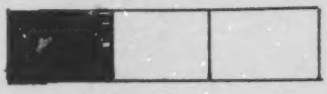
$\frac{3}{8}$ ◯ $\frac{5}{8}$



$\frac{3}{4}$ ◯ $\frac{2}{4}$

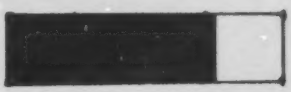


$\frac{6}{8}$ ◯ $\frac{4}{8}$



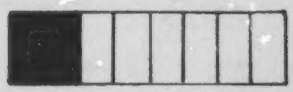
$\frac{1}{3}$ ◯ $\frac{2}{3}$

$\frac{4}{6}$ ◯ $\frac{2}{6}$



$\frac{3}{4}$ ◯ $\frac{1}{4}$

$\frac{3}{6}$ ◯ $\frac{5}{6}$



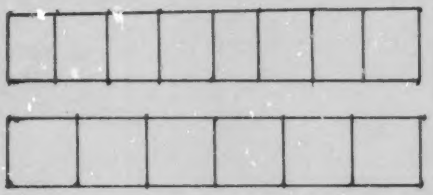
$\frac{2}{8}$ ◯ $\frac{4}{8}$

P.O. 3.06.01.05

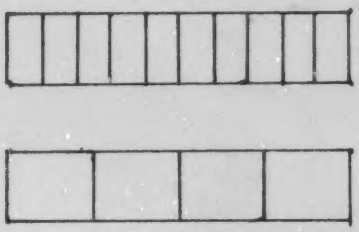
NAME: _____ CLASS: _____ DATE: _____

Color in the fraction.
Place the symbol > or < in each circle to make the sentence correct.

$\frac{1}{3}$ (>) $\frac{1}{6}$

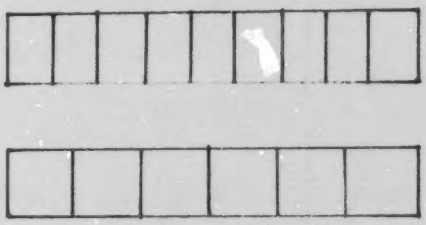


$\frac{1}{8}$ ( ) $\frac{1}{6}$

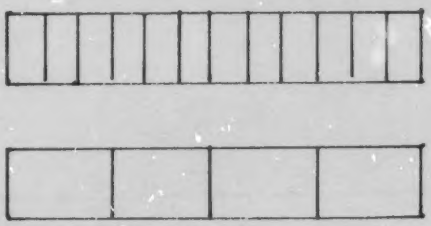


$\frac{1}{10}$ ( ) $\frac{1}{4}$

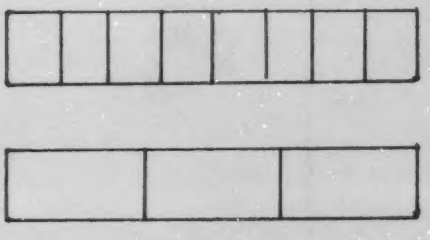
$\frac{1}{3}$ ( ) $\frac{1}{2}$



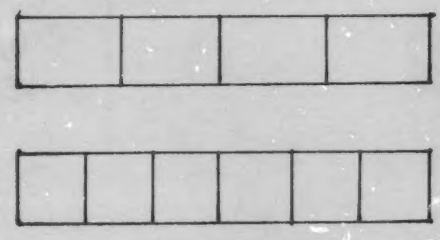
$\frac{1}{9}$ ( ) $\frac{1}{6}$



$\frac{1}{12}$ ( ) $\frac{1}{4}$



$\frac{1}{8}$ ( ) $\frac{1}{3}$



$\frac{2}{4}$ ( ) $\frac{1}{6}$

3.10.03 WEIGHT IN CUSTOMARY UNITS

(1 lesson)

PERFORMANCE OBJECTIVES

The student will be able to...

3.10.03.01B measure familiar objects to the nearest $\frac{1}{2}$ pound and $\frac{1}{4}$ pound;

e.g.,

How much does the fruit weigh to the nearest half pound?

____

3.10.03.02B read various types of scales using customary units.

e.g.,

3 lb.

12 oz.

1 oz.

3.10.03

VOCABULARY

TERMS	**SYMBOLS**
pound	lb.
ounces	oz.

GETTING STARTED

Write the following on the chalkboard.

e.g.,

$$\begin{array}{r} \frac{1}{4} \\ +\frac{1}{4} \\ \hline \end{array} \qquad \begin{array}{r} \frac{1}{3} \\ +\frac{1}{3} \\ \hline \end{array} \qquad \begin{array}{r} \frac{2}{4} \\ +\frac{1}{4} \\ \hline \end{array}$$

Say, "We are going to add these fractions. What must we remember when we add fractions?" Elicit from students that when adding fractions, we add only the numerators if the denominators are the same. Ask the students to come to the chalkboard to complete the example.

Repeat this procedure using other examples.

Write the following headings on the chalkboard.

Item	Estimate	Actual Weight

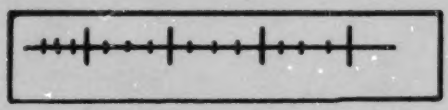
Prepare a scale and several items to be weighed, e.g., a book, a ball, a pencil, a cup, glue, a stapler. Display an item and ask a student to guess how much it weighs. Write his/her answer under Estimate. Ask another student to weigh the item on the scale. Write the answer on the chalkboard under Actual Weight. Continue weighing and estimating.

3.10.03

3.10.03.01 measure familiar objects to the nearest $\frac{1}{2}$ pound and $\frac{1}{4}$ pound

STRATEGY 1: Say, "How many ounces are there in a pound?" Elicit from the students that there are 16 ounces in one pound. Say, "How can we find the number of ounces there are in $\frac{1}{2}$ pound and $\frac{1}{4}$ pound?" Elicit from the students that we divide 16 ounces into two equal parts to determine that 8 ounces = $\frac{1}{2}$ pound and we divide 16 ounces into 4 equal parts to determine that 4 ounces = $\frac{1}{4}$ pound. Draw the following on the chalkboard.

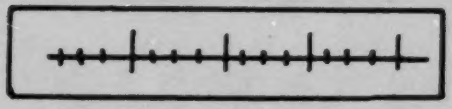
e.g.,



Say, "This is a one pound marking on a scale. Each small mark represents one ounce." Ask one student to come to the chalkboard to indicate where the arrow would be if an object weighed $\frac{1}{4}$ pound, $\frac{1}{2}$ pound, $\frac{3}{4}$ pound and one pound. Point to the three ounce line. Say, "What does this object weigh?" Elicit from the students that the nearest measure we are using makes it $\frac{1}{4}$ pound. Repeat this procedure using other examples. Use a scale and a variety of classroom objects to find their weight to the nearest pound, $\frac{1}{2}$ pound or $\frac{1}{4}$ pound.

STRATEGY 2: Draw the following on the chalkboard.

e.g.,



Say, "This is a one pound marking on a scale. What does each line represent?" Elicit from the students that each line represents one ounce. Say,

STRATEGY 2: cont'd

"Are some of the lines longer than others?" Elicit from the students that every fourth line is longer. Say, "Each long line represents 4 ounces. Who can say four ounces in another way?" Elicit from the students that 4 ounces equals $\frac{1}{4}$ pound, eight ounces equals $\frac{1}{2}$ pound and 12 ounces equals $\frac{3}{4}$ pound. Say, "We are going to weigh objects to the nearest $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ or one pound." Point to 3 ounces on the scale. Say, "What would this mark show?" Elicit that it weighs about $\frac{1}{4}$ pound. Repeat this procedure using other examples. Then using the classroom scale weigh objects to the nearest $\frac{1}{4}$, $\frac{1}{2}$ or pound.

3.10.03.02 read various types of scales using customary units

STRATEGY 1: Prepare scales that measure different units and a variety of classroom objects of varied weight. Exhibit an object, e.g., a pencil. Say, "Would we measure this object using a scale that measures pounds or a scale that measures ounces?" Elicit that an ounce scale would be appropriate because the item is light. Ask the students to estimate the weight. Write the estimate on the chalkboard. Ask another student to weigh the object on the appropriate scale and record the actual weight next to the estimate. Say, "Were we close?" Repeat this procedure using the other classroom items.

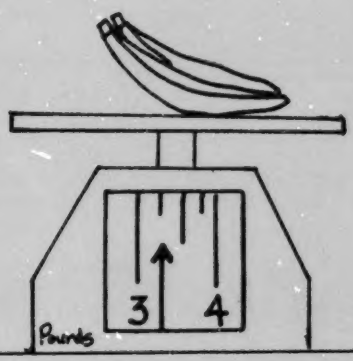
STRATEGY 2: Adapt Strategy 2 used in P.O. 3.10.04.02 for reading various types of scales using customary units.

P.O. 3.10.03.01.

NAME: _____ CLASS: _____ DATE: _____

Write the weight to the nearest $\frac{1}{4}$ pound that is shown on each scale.

Answer $3\frac{1}{4}$ lbs.



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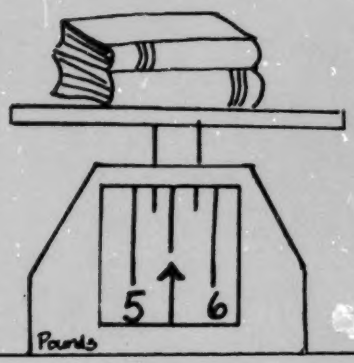

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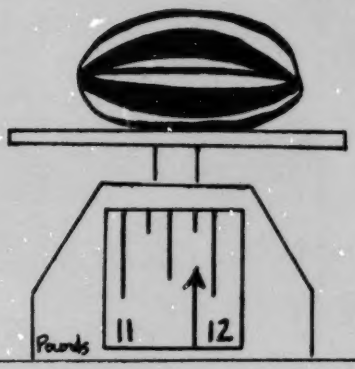

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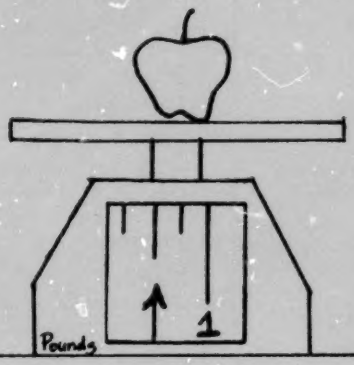

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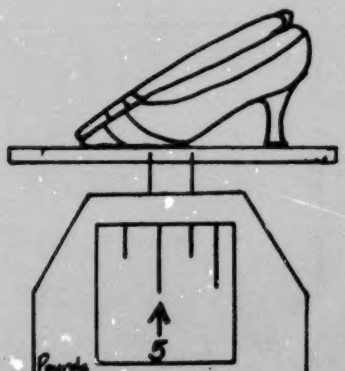

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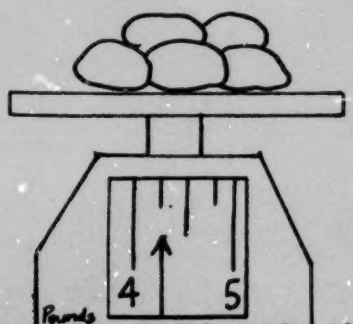


83

P.O. 3.10.03.01

NAME: _____ CLASS: _____ DATE: _____

Use two different scales to weigh each object. Be sure to weigh each object to the nearest $\frac{1}{4}$, $\frac{1}{2}$ or pound and in pounds and ounces.

Object	SCALE 1		SCALE 2	
	Pounds-Ounces	Nearest $\frac{1}{4}$, $\frac{1}{2}$ or pounds	Pounds-Ounces	Nearest $\frac{1}{4}$, $\frac{1}{2}$ or pounds.
TEXT BOOK				
RULER				
BOX OF CRAYONS				
NOTE BOOK				
SHOE				
JAR OF PASTE				
EMPTY BOOKBAG				
BOOKBAG WITH USUAL BOOK				

3.10.04 WEIGHT IN METRIC UNITS

(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.10.04.01B identify equivalent metric units of weight;
e.g.,

1 gram = 1000 miligrams
1 kilogram = 1000 grams

3.10.04.02B read various types of scales using metric units.
e.g.,

3mg 700g 2kg

3.10.04

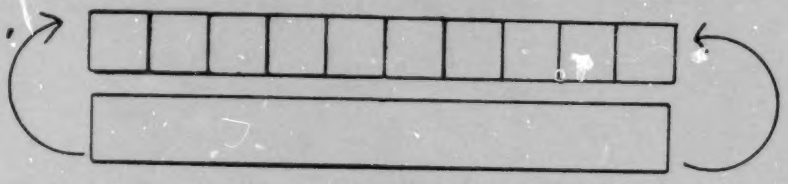
VOCABULARY

TERMS	**SYMBOLS**
gram	g
milligram	mg
kilogram	kg
balance scale	

GETTING STARTED

Prepare and distribute squared material to groups of students. Say, "How many ones are in 1 ten?" Elicit 10 and show how 10 unit squares fit on 1 ten strip.

e.g.,



Repeat by asking how many ten strips fit on a hundred square, how many unit squares fit on a hundred square, how many hundred squares make one thousand, until you have established relationships.

e.g.,

10 ones = 1 ten
10 tens = 1 hundred
10 hundreds = 1 thousand
100 ones = 1 hundred

Prepare several objects of different weights, e.g., a brick, a paper clip, a box of cereal, a coin. Ask the students to compare the weight of the objects by asking questions.

e.g.,

Which is heavier, the brick or the coin?
Which is lighter, the cereal or the paper clip?

Ask the students how they would verify their answers. Elicit by feeling or by weighing.

3.10.04

3.10.04.01 **identify equivalent metric units of weight**

STRATEGY 1: Prepare a balance scale or kilogram dial scale and gram or kilogram weights made of plastic or metal. The gram weights should include several 50g, 100g, and 500g items. Place the kilogram weight on one side of the scale. Ask a student to place enough gram weights on the other side of the scale to balance the kilogram. Write 1 kilogram = ____ grams on the chalkboard. Elicit 1kg = 1000 grams from the weighing. Repeat the weighing to investigate other relationships.

e.g.,

How many 500 gram weights would weigh approximately 1 kilogram? (two)
What part of a kilogram is 500g? (1/2 kg)
How many 200 gram weights would weigh approximately 1 kilogram? (five)
What part of a kilogram is 200g? ($\frac{1}{5}$)
How many 100 gram weights would weigh 1kg? (10)
What part of a kilogram is 100g? ($\frac{1}{10}$)
How many grams are there in $\frac{1}{10}$ of a kilogram (100g)
How many grams are equivalent to $\frac{1}{100}$ of a kilogram?...to $\frac{1}{4}$ of a kilogram?

Summarize the relationships.

1000g = 1kg
500g = $\frac{1}{2}$kg
100g = $\frac{1}{10}$kg

STRATEGY 2: Prepare a balance scale, a package of low calorie sweetener, and an empty quart container of milk, as well as other objects which weigh 1 kilogram, 1 gram, 500 grams and a set of weights. Ask a

3.10.04

STRATEGY 2: cont'd

student to weigh the sweetener and record the weight on the chalkboard. Fill the milk container with water and ask a student to weigh it. Record the weight on the chalkboard. Say, "If the sweetener weighs one gram and the container weighs 1000 grams or one kilogram, how many packets of sweetener would we need to balance the container?" Elicit 1000 packets and write 1 kilogram = 1000 grams. Repeat the weighing to determine other metric equivalents.

3.10.04.02 **Read various types of scales using metric units**

STRATEGY 1: Prepare two or three different types of scales. Ask the students to weigh different classroom items, e.g., writing implements, books, manipulative materials. Before each item is weighed say, "Do you think we will measure this in grams or kilograms? How much do you think it weighs?" Compare the estimates with actual weights.

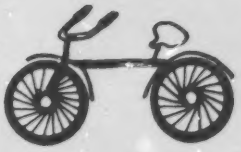
STRATEGY 2: Prepare boxes and cans from a supermarket which have the weight on them. Prepare 2 or 3 different types of scales which measure different units. Ask a student to choose an item and determine which scale to weigh it on. Estimate the weight. Compare the weight to the labeled weight as well as the estimate.

Repeat this procedure using all of the items.

P.O. 3.10.04.01

NAME: _____ CLASS: _____ DATE: _____

Write g for grams or k for kilograms to tell the unit weight of each.

1.
2. 
3.
4.
5.
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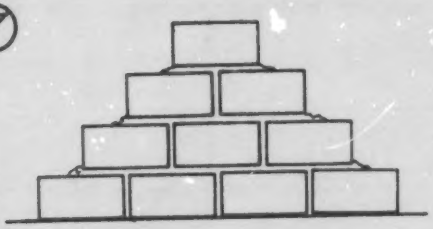
7. 
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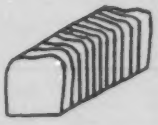
10. 
11.
12.

P.C. 3.10.04.02

NAME:_____ CLASS:_____ DATE:_____

Use two different scales to weigh each object.

OBJECT	1	2
Penny		
Nickel		
Slice of bread		
Pretzel		
Apple		
Cookie		
Pencil		
Crayon		
Notebook		
Ruler		
Paper clip		
Sponge		
Marble		

3.14.02 PLACE VALUE AND EXPANDED NOTATION THROUGH 999

(ongoing)

PERFORMANCE OBJECTIVES

The student will be able to...

3.14.02.01 identify the place value of any digit in a number through 999;
e.g.,

H	T	O
4	9	7
	3	6

3.14.02.02 write a 2- or 3-digit number in expanded notation;
e.g.,

479 = _____ Hs _____ Ts _____ Os
36 = _____ Hs _____ Ts _____ Os

3.14.02.03 identify and write a number in expanded notation.
e.g.,

4 hundreds, 9 tens, 7 ones = 497
5 hundreds, 3 tens, 6 ones =
4 tens, 5 ones =

3.14.02

VOCABULARY

TERMS

place value
expanded notation

GETTING STARTED

Write a 3-digit number that is not in place value on the chalkboard.
e.g.,

6
2 4

Ask the students which number represents the ones place, the tens place, and the hundreds place. Say, "Why are you having difficulty reading the number?" Say that it is important to use proper place value when writing numbers. Say, "We cannot read this number because each number is not in a specific place." Rewrite the digits at the chalkboard, e.g., 642. Ask a student to read the number. Say, "This number can now be read because each number is in its proper place." Continue this activity by writing other 2- and 3-digit numbers on the chalkboard.

Prepare and distribute a supply of squared materials to each student. Draw nine (9) small squares on the chalkboard. Instruct the students to do the same with their materials. Ask a student to write the number represented on the chalkboard. Draw one more square on the chalkboard. Ask the students to do the same. Say, "How many squares are there?" Elict that there are now 10 squares. Say that in order to record this number, you must regroup the 10 ones as one ten. Erase the display at the chalkboard and draw a tens model.
e.g.,

GETTING STARTED cont'd

Ask the students to display a group of ten using their materials. Write several 2-digit numbers on the chalkboard. Ask the students to represent each by using the squared materials.

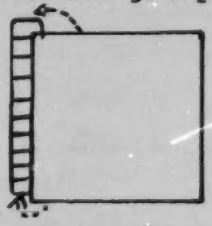
e.g.,

11 =

Ask the students to display the number 99. Write representations on the chalkboard.

e.g.,

Add one (1) square to the representation at the chalkboard. Say, "How many are represented?" Elicit that the model now represents 100. Instruct students to regroup the 10 ones as 1 ten. Say that there are now 10 tens. Remind the students of the regrouping rule and say that the same rule applies to tens. Ask the students to exchange the 10 tens for one group of one hundred.

e.g., 

Continue the activity by using other examples of numbers of hundreds, tens and ones, and ask the students to represent each number using the squared materials.

3.14.02

3.14.02.01 **Identify the place value of any digit in any number through 999**

STRATEGY 1: Use a flannel board and cut out models of hundreds, tens, and ones. Place 3 ones and 2 tens on the flannel board. Say, "How many ones and how many tens are there?" Place other 2-digit number representations on the flannel board. Ask the students to identify the number of ones and the number of tens shown. Repeat this activity using 3-digit representations. Continue this procedure until the students can accurately identify the number of hundreds, tens and ones in a given representation. To ensure the understanding of the place value of a digit write a numeral such as 777 on the chalkboard, and ask a student to draw a box around the 7 in the ones place, a circle around the 7 in the hundreds place and a triangle around the 7 in the tens place.
e.g.,

STRATEGY 2: Write the following heading on the chalkboard.
e.g.,

Hundreds	Tens	Ones

Write a 2- or 3-digit number using the appropriate columns. Ask a student to read the number. Ask another student to come to the chalkboard and circle the number of tens in the number. Ask other students to identify the number of hundreds, and ones in the number. Repeat this procedure using other 2- or 3-digit numbers. When the students are able to identify the place value of a given digit

STRATEGY 2: cont'd

in a number, reverse the activity. Play a riddle number game. Say, "I have two hundreds, 4 tens and 6 ones. What number am I?" The student who correctly identifies the number has earned the right to come to the front of the room and recite another number riddle. Continue this activity until students can accurately identify a number when given the place value digits.

3.14.02.02 write a 2- or 3-digit number in expanded notation

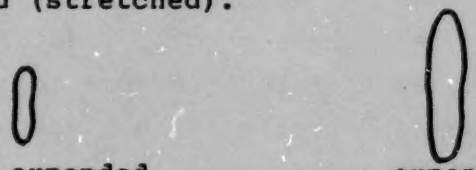
STRATEGY 1: Write the number 563 on the chalkboard. Ask the students to identify the place value of each digit in the number. Write the following on the chalkboard.

563 = 5 hundreds, 6 tens, 3 ones

Ask a student to fill in the blanks. Say, "563 is equal to 5 hundreds + 6 tens + 3 ones." Ask the students to copy the expanded number in their notebooks. Repeat this procedure using other 2- or 3-digit numbers to be written in expanded notation. Make the teaching of this concept into a game. Divide the class into two groups. The first person of the first group writes a 2- or 3-digit number on the chalkboard. The first person of the second group must write the number in the expanded form. If he/she writes it correctly, then that team receives a point. If not, the other team gains the point. The team that scores the point is the team to write the next number on the chalkboard. The team with the most points at the end of the allotted time, wins.

3.14.02

STRATEGY 2: Display a rubber band. First hold the rubber band without being expanded (stretched) then with being expanded (stretched).
e.g.



not expanded expanded

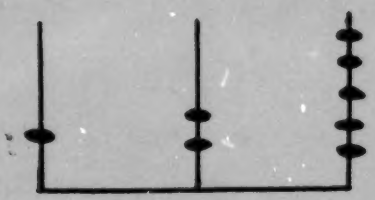
Elicit from the students the differences between the two. Say, "Just like a rubber band, a number has an expanded form." Write the number 123 on the chalkboard. Say that this number is like the rubber band before it is expanded. Write the expanded form of the number and ask the student to compare it to the expanded form of the rubber band.
e.g.,

123 = 1 hundred + 2 tens + 3 ones

Explain each part of the expanded notation and show to what it refers. Ask the students to copy the number in expanded notation. Repeat this procedure using other 2- or 3-digit numbers to be written in expanded notation.

3.14.02.03 identify and write a number in expanded notation

STRATEGY 1: Display an abacus at the front of the room. Say that the different columns of place value are represented by the various colors, e.g., the red column on the far right represents the ones column, ... Represent the following number on the abacus.
e.g.,

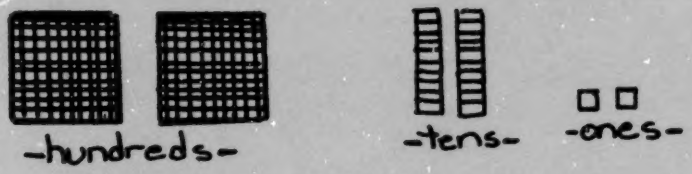


STRATEGY 1: cont'd

Say, "How many hundreds are presented on the abacus?" Write the elicited response on the chalkboard. Repeat the same question for the tens and ones columns. Write the responses on the chalkboard in the expanded form, e.g., 1 hundred + 2 tens + 5 ones = . Ask a student to write the number in standard form. Say, "1 hundred, 2 tens, 5 ones is equal to 125." Ask the students to write the expanded notation and standard numbers in their notebooks. Present another 2-or 3-digit number on the abacus. Repeat the line of questioning above. Encourage the students to identify the number and write it in expanded notation. Ask a student to write the expanded form of the number on the chalkboard, and identify the number in standard form also. Repeat this procedure using other examples of numbers on the abacus.

STRATEGY 2: Draw the following representation of a number on the chalkboard. Under each set of diagrams, write the words hundreds, tens and ones.

e.g.



Show the word to which each picture corresponds, e.g., large boxes are hundreds, strips are tens and small squares are ones. Ask the students to identify the number represented in each group. Write each number in its proper place. Ask a student to identify the number. Instruct the students to copy the expanded notation and number into their notebooks. Present other representations on the chalkboard. Encourage the students to write

STRATEGY 2: each number in its expanded form. Ask a student to write the expanded notation and identify the number at the chalkboard. Instruct the students to check their work with the correct answer on the chalkboard. Repeat this procedure using other representations of numbers.

P.O. 3.14.02.01

NAME:_____ CLASS:_____ DATE:_____

Circle the numeral in the ones place (0)
Draw a square around the numeral in the tens place (□)
Underline the numeral in the hundreds place (–)

3 4 2	1 6 5
2 9	2 3 7
8 4 9	6 8
1 0 9	9 0
3 8	4 2 1

NOW TRY THESE.....

What does the digit 6 mean in each numeral?
(Hundreds, Tens, or Ones)

The 6 in 165 means 6_____.

The 6 in 16 means 6_____.

The 6 in 682 means 6_____.

The 6 in 226 means 6_____.

The 6 in 560 means 6_____.

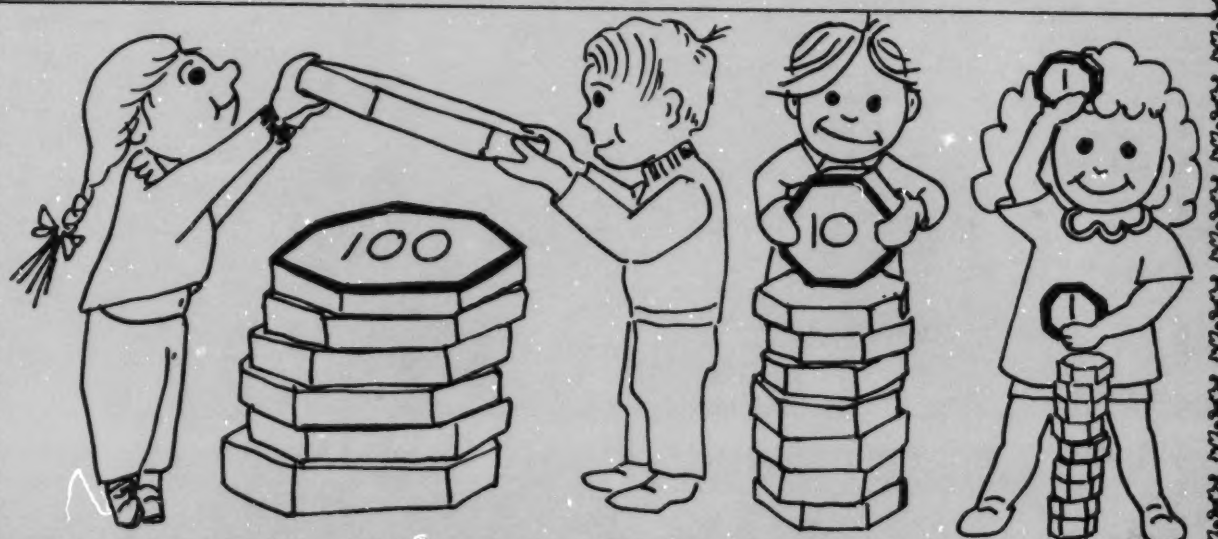
The 6 in 601 means 6_____.

P.O. 3.14.02.02

NAME: _____ CLASS: _____ DATE: _____

Fill in the box.

245 is		hundreds		tens		ones
518 is		hundreds		tens		ones
602 is		hundreds		tens		ones
87 is		hundreds		tens		ones
268 is		hundreds		tens		ones
494 is		hundreds		tens		ones
750 is		hundreds		tens		ones
25 is		hundreds		tens		ones

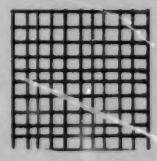


P.O. 3.14.02.03

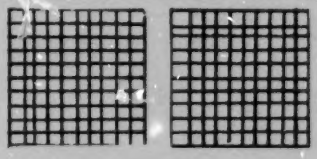
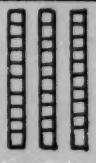
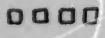
NAME: _____ CLASS: _____ DATE: _____

PART I - Write the numerals

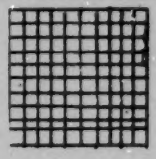
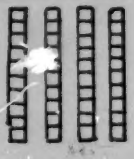
PART II - Write the expanded form for each numeral



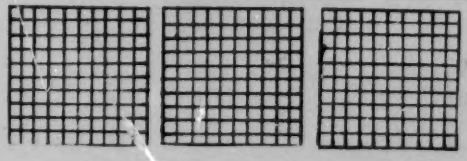
1 hundred 1 ten 1 ones = 111

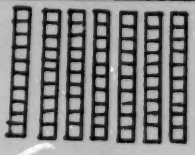
2 hundreds 3 tens 4 ones = _____

1 hundred 4 tens 2 ones = _____



3 hundreds 0 tens 3 ones = _____



0 hundreds 7 tens 4 ones = _____

Write the expanded form for each numeral.

214 is 2 hundreds, 1 ten, 4 ones.

165 is _____.

406 is _____.

382 is _____.

49 is _____.

3.01.01 COUNT BY TENS AND HUNDREDS

(1 lesson)

PERFORMANCE OBJECTIVES

The student will be able to...

3.01.01.01A count by tens forward and backward within the hundreds;
e.g.,
200, 210, 220, ..., 300
600, 590, 580, ..., 500

3.01.01.02A count by hundreds forward and backward to and from 1000.
e.g.,
100, 200, 300, ..., 1000
1000, 900, 800, ..., 100

3.01.01

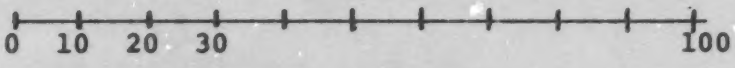
VOCABULARY

TERMS

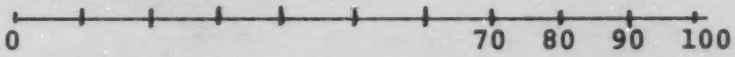
forward
backward

GETTING STARTED

Draw a number line on the chalkboard; number the first point zero. Ask students to count by tens to one hundred. As each number is stated, complete the number line on the chalkboard.
e.g.,



Draw a number line on the chalkboard. Place the numbers from right to left as the students count by tens from 100 through 0.
e.g.,



Refer back to the first number line as a check.

3.01.01

3.01.01.01 **count by tens forward and backward within the hundreds**

STRATEGY 1: Say, "Let's start with one hundred and count forward by ones to two hundred." Elicit from students that the sequence is 101,102,103,104...200. Say, "Now let's count by tens beginning with two hundred." e.g., 200,210,220,230...300. Write the students' responses on the chalkboard as they count, so that the pattern is visually clear. Ask the students to observe which column changes. Say, "Do you see a pattern? What is it? Will the pattern change if we start with 400? 600? 900?... Why doesn't it change?" Elicit that we are still counting by tens. Repeat the procedure counting backward by tens.

STRATEGY 2: Prepare a pack of cards numbered by tens, e.g., 200,210,220... Call out a number e.g., 230. The student holding the card with 230 will come to the front of the room. Say, "Who has the card which comes after this when counting by tens? Who has the card that comes before?" Ask the students with these cards to place themselves in the correct order in the front of the room. When this has been done, have the class read the numbers from left to right in unison. Say, "Who has the card which comes after 240?" Repeat the procedure until you reach 300.
Repeat this procedure adapting it for counting backward.

3.01.01

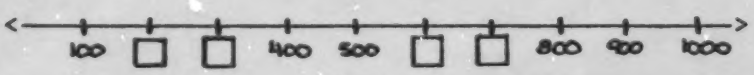
3.01.01.02 count forward and backwards by 100 to and from 1000

STRATEGY 1: Prepare ten flash cards having the numbers 100,200,300,...1000 on them. Distribute to 10 students. Say, "Who has the card with one hundred on it?" Ask a student to come to the front of the room. Say, "What number comes next? Who has this card?" Ask this student to stand next to the student with the 100 card. Say, "Who has the card with the number that has 300 on it? Who has the card that comes after 300?" Repeat the questioning until all ten cards have been used. Ask a student to act as a recorder and write the series on the chalkboard. Repeat this procedure using ten other students.

Repeat this procedure to count backward by hundreds.

STRATEGY 2: Draw a number line on the chalkboard omitting various numbers.

e.g.,



Elicit from the students which number follows 100 when counting by hundreds (200). Ask a student to come to the chalkboard and fill in the square. Continue with this procedure until the number line is complete.

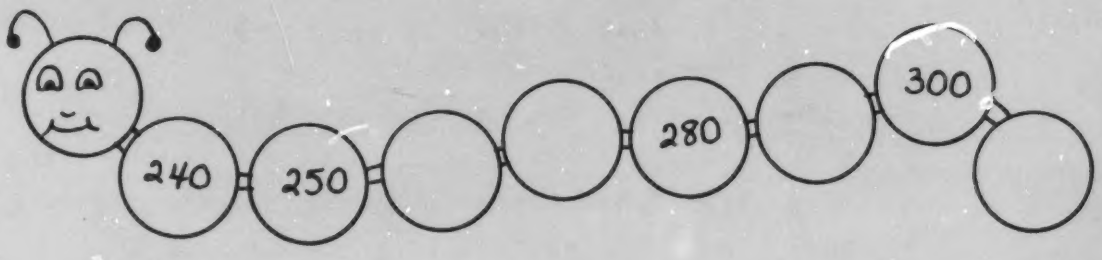
Ask the students to observe the numbers in the number line to see which colunn changes. Elicit that we are counting by hundreds.

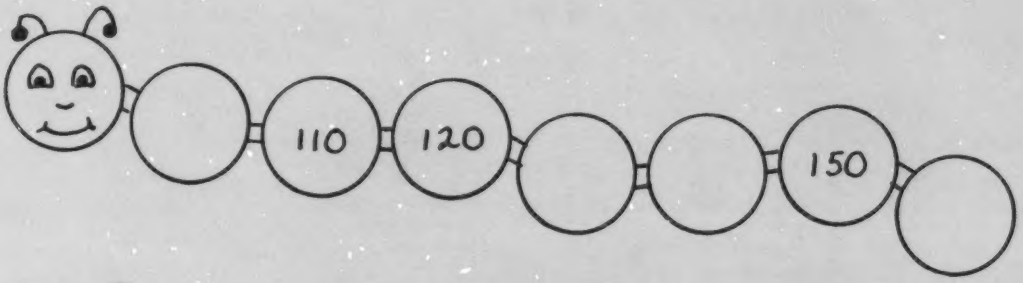
Repeat this procedure adapting it to counting backward by hundreds from 1000.

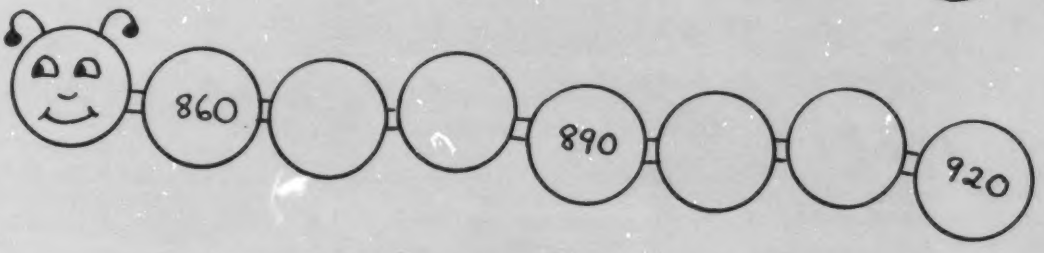
P.O. 3.01.01.01

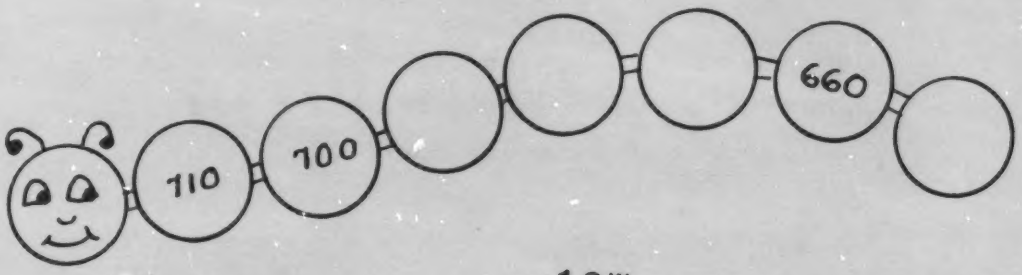
NAME: _____ CLASS: _____ DATE: _____

Fill in the caterpillar by writing in the missing numbers as you count by tens.







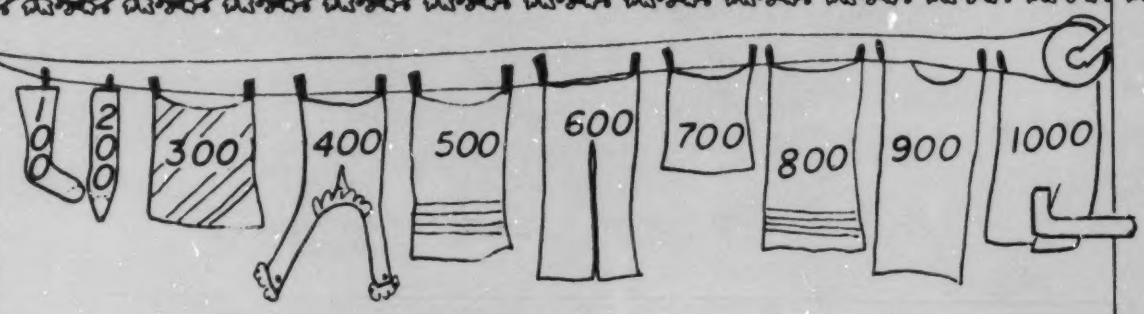


127

P.O. 3.01.01.02

NAME: _____ CLASS: _____ DATE: _____

Complete the number pattern counting by 100's.



500 , 600 , _____ , _____ , _____

300 , 400 , _____ , _____ , _____

231 , 331 , _____ , _____ , _____

128 , 228 , _____ , _____ , _____

569 , _____ , _____ , _____ , 969

320 , _____ , _____ , _____ , 720

630 , _____ , _____ , _____ , _____

200 , 300 , _____ , _____ , _____

380 , _____ , _____ , _____ , _____

551 , 651 , _____ , _____ , _____

404 , 504 , _____ , _____ , _____

690 , 790 , _____ , _____ , _____

420 , 520 , _____ , _____ , _____

3.01.02 ROUND 2-AND 3-DIGIT NUMBERS TO THE NEAREST TEN/HUNDRED

(3 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.01.02.01A round 2-and 3-digit numbers to the nearest ten;
e.g.,
37 rounds to 40
351 rounds to 350
96 rounds to 100

3.01.02.02A round a 3-digit number having a tens digit less than 5 to the nearest hundred;
e.g.,
249 rounds to 200
136 rounds to 100

3.01.02.03A round a 3-digit number having 5 for its tens digit to the nearest hundred;
e.g.,
251 rounds to 300
350 rounds to 400

3.01.02.04A round a 3-digit number having its tens digit more than 5, to the nearest hundred;

e.g.,

163 rounds to 200
487 rounds to 500
578 rounds to 600

3.01.02.05B estimate large numbers.

e.g.,

Guess how many beans are in this jar?

VOCABULARY

TERMS

estimate
nearest ten
nearest hundred
nearest thousand

GETTING STARTED

Divide the students into groups of 4. Each group will have a glass jar of no more than 70 jelly beans and a copy of the following chart.

Name	1st Estimate	2nd Estimate

Ask each student to enter his/her name on the chart. Say, "There are less than 100 jelly beans in each jar." Ask students to examine the jar carefully. Say, "Guess how many jelly beans are in the jar. Then write your estimate on the chart under 1st Estimate, next to your name." Ask for one estimate from each group and write it on the chalkboard. Ask one (1) student from each group to count the jelly beans by tens. After one (1) minute ask the students to stop and make a second estimate based on the counting. Continue counting until the actual amount is found. The student who comes closest in each group wins the jar.

Ask a student to count by tens from 10 to 100. Display flash cards containing of multiples of 10 (10,20,30...100) written in blue on the ledge of the chalkboard. Prepare a box containing flash cards (written in red) with numbers that <u>are</u> <u>not</u> multiples of ten, e.g., 42, 57.

GETTING STARTED cont'd

Ask a student to pick a card from the box and read to the class the number he/she chooses. Say, "Look at the numbers on the ledge of the chalkboard. Where would 42 belong?" Ask a student to place the card between 40 and 50. Repeat using other numbers in the box.

3.01.02

3.01.02.01 round a 2- and 3-digit numbers to the nearest ten

STRATEGY 1: Prepare a grocery bag with the following items: 1 apple, 1 granola bar, 1 small box of raisins, 1 roll of paper towels, 1 16oz. can of tomato sauce (or pictures of these items). Write the names of the items on the chalkboard as you take them from the grocery bag. Write the price next to each, e.g., apple 17¢, granola bar 27¢, raisins 32¢, paper towels 79¢, tomato sauce 48¢ and peanuts 36¢.

e.g.,

SHOPPING TRIP

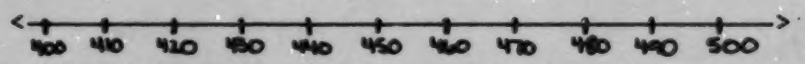
List	Actual Price	Estimated Price to the Nearest 10¢
apple	17¢	
granola bar	27¢	
raisins	32¢	
paper towels	79¢	
tomato sauce	48¢	
peanuts	36¢	

Say, "How can we estimate the total cost of these items?" Elicit that we round the cost of each to the nearest 10¢. Point to the price of the apple on the chart. Ask, "What is 17¢ rounded to the nearest 10¢?" Ask a student to write the answer in the estimate column. Repeat this procedure for all of the items on the list. Say, "What is the total cost to the nearest 10¢?" Ask the students to add the actual price of the items and compare the two totals.

3.01.02

STRATEGY 2: Prepare a box with 10 number cards in it. The numbers on the cards should be between 400 and 500 e.g., 416, 493. Draw a number line on the chalkboard.

e.g.,



Say, "This number line represents the bus route for the 5th Avenue bus. Each number you see is an address on 5th Avenue." Point to 400. Say, "This is 400 Fifth Avenue." Repeat this procedure for a few addresses. Say, "The bus does not stop at addresses in between the numbers you see." Ask a student to pick a number from the box. Say, "What bus stop is closest to this number?" Say to the students that you arrive at the closest stop by looking at the ones place in each number. If the number in the ones place is between 1 and 4, the bus will stop at the lower bus stop number and if the number is between 5 and 9, the bus will stop at the higher bus stop number.

Repeat this procedure using the cards in the box.

3.01.02.02 round a 3-digit number having a tens digit less than 5 to the nearest hundred

STRATEGY 1: Prepare a number line with multiples of 100, e.g., 100, 200, 300,... 1000. Say, "You are preparing the hot dogs for a football game on Sunday. If the stadium holds 364 people, how would you estimate the number of hot dogs you will need to prepare?" Elicit round 364 to the nearest hundred. Say, "Where does 364 belong on the number line? Which hundred is nearest to it?" Elicit 400.

STRATEGY 1: cont'd

Repeat this procedure using this problem.

There are 840 people at a baseball game. How many sodas would be needed to the nearest hundred?

STRATEGY 2:

Write on the chalkboard various 3-digit numbers having a number less than 5 in the tens place. Ask the class to round each number to the nearest hundred. Elicit answers from the class. Write 737 rounds to 700, 341 rounds to 300 on the chalkboard. Ask individual students to round a given number and to state the rule he/she used to obtain the answer.

3.01.02.03 round a 3-digit number having "5" for its tens digit to the nearest hundred

STRATEGY 1:

Prepare for each student a card similar to the one below, but with different numbers, and markers with which to cover the squares.

e.g.,

100	800	200
400	Free	700
600	300	900

Say, "Today we are going to play Rounding Bingo. I will call a number and you will round the number to the nearest hundred. Then you will cover the nearest hundred number with a marker. When you have 3 squares covered in a row horizontally, vertically, or diagonally, call 'Bingo' and stand up. You will read your three (3) numbers and we will check your answers." Explain that you are only using numbers which have a 5 in the tens column, e.g., 456, 351.

STRATEGY 1: cont'd

Say, "How do we round these numbers to the nearest hundred?" Elicit that numbers with a 5 in the tens column and 0 in the ones column round to the larger hundred. Write 456 on the chalkboard. Say, "To What nearest hundred is 456 rounded?" (500) Repeat this procedure using 352, 659. Distribute cards and markers and begin the game. Write each number that you call on the chalkboard. Play several times.

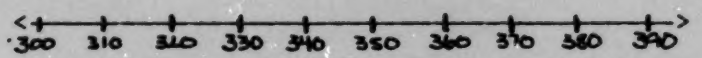
STRATEGY 2:

Adapt Strategy 2 used in P.O. 3.01.05.02 for rounding a 3-digit number having 5 for its tens digit.

3.01.02.04 round a 3-digit number having its tens digit more than 5 to the nearest hundred

STRATEGY 1:

Draw a number line on the chalkboard.
e.g.,



Explain that this number line counts by tens from 300 through 400. Point to 350. Ask, "Which digit in this number helps us determine how to round it to the nearest hundred?" Point to the numbers 360, 370, etc. until 400. Say, "These numbers are all higher than 350. How do you think we will round these numbers to the nearest hundred?" Elicit that when the tens digit is greater than five, change the tens and ones digits to zero and increase the hundreds digit by one.
e.g., 171 rounds to 200
463 rounds to 500

3.01.02

STRATEGY 1: cont'd

Write 267, 387 and 175 on the chalkboard and ask different students to round each to the nearest hundred.

STRATEGY 2: Adapt Strategy 1 used in P.O. 3.01.05.02 for rounding a 3-digit number having a tens digit more than 5.

3.01.02.05 **estimate large numbers**

STRATEGY 1: Divide the class into groups of 4. Each group will have a dropper, an 8 oz. cup or glass, and a basin of water. Write on the chalkboard: "How many drops of water will fill the cup?" Ask students to make an estimate to the nearest hundred. Say to the students that they may use any or all materials on the table to help. Give clues, e.g., "How many drops fill the dropper? How many droppers fill the cup?" Record each estimate on a chart on the chalkboard. Compare and discuss how each group arrived at their answers. Ask a student to actually fill the cup and determine which group is closest to the actual answer.

STRATEGY 2: Divide students into pairs. Distribute colored rods to each pair of students. Write on the chalkboard and say, "How many small rods will it take to go across the desk from one end to the other?" Give clues such as "Which rod would be easiest to use to measure the length of the desk? How many small rods are equal to a large rod?" Instruct each pair of students to write down their estimates. Ask each pair to actually measure the desk and compare the actual number with the estimate.

P.O. 3.01.02.01

NAME: _____ CLASS: _____ DATE: _____

Part I: Draw a circle around the ten closest to the middle number.
Part II: Round to the nearest ten.

I.

1.	(50)	53	60	2.	60	69	70
3.	40	45	50	4.	80	84	90
5.	120	125	130	6.	150	156	160
7.	130	132	140	8.	270	276	280

II.

9.	42	____	10.	159	____
11.	96	____	12	365	____
13.	241	____	14.	85	____
15.	759	____	16.	927	____

3.01.02.02
P.O._____

NAME:_____ CLASS:_____ DATE:_____

Round each number to the nearest hundred.

When the numeral in the tens place is 1, 2, 3 or 4, you change the numeral in the tens and ones place to zero, and keep the same numeral in the hundreds place.

Round each number to the nearest hundred.
Example: 249 - 200

136 - rounds to _____ 720 - rounds to _____ 405 - rounds to _____

616 - rounds to _____ 635 - rounds to _____ 607 - rounds to _____

823 - rounds to _____ 417 - rounds to _____ 543 - rounds to _____

909 - rounds to _____ 225 - rounds to _____ 807 - rounds to _____

543 - rounds to _____ 437 - rounds to _____ 125 - rounds to _____

441 - rounds to _____ 341 - rounds to _____ 346 - rounds to _____

734 - rounds to _____ 529 - rounds to _____ 629 - rounds to _____

317 - rounds to _____ 220 - rounds to _____ 919 - rounds to _____

112 - rounds to _____ 330 - rounds to _____ 440 - rounds to _____

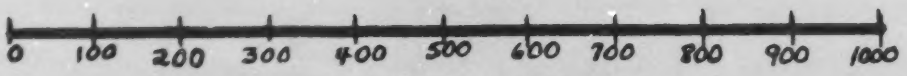
If there are 947 students in school, to the nearest hundred, how many desks does the school need? _____

Will this be enough for all the students?_____

P.O. 3.01.02.03

NAME:_____ CLASS:_____ DATE:_____

Write the closest stop to each address.



THE SCHOOL BUS STOPS AT ALL THE ADDRESSES ON THE NUMBER LINE.
BELOW ARE SOME CHILDREN AND THEIR ADDRESSES.
WRITE THE STOP THAT IS CLOSEST TO EACH CHILD'S HOUSE.

255 _____

257 _____

857 _____

355 _____

951 _____

957 _____

657 _____

158 _____

754 _____

859 _____

559 _____

953 _____

I.O. 3.01.02.04

NAME: _____ CLASS: _____ DATE: _____

Round each animal's weight to the nearest hundred pounds.

Sample:

362

360 lb.

395

123

147

256

695

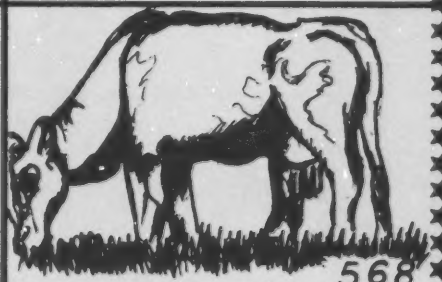
303

453

781

678

992

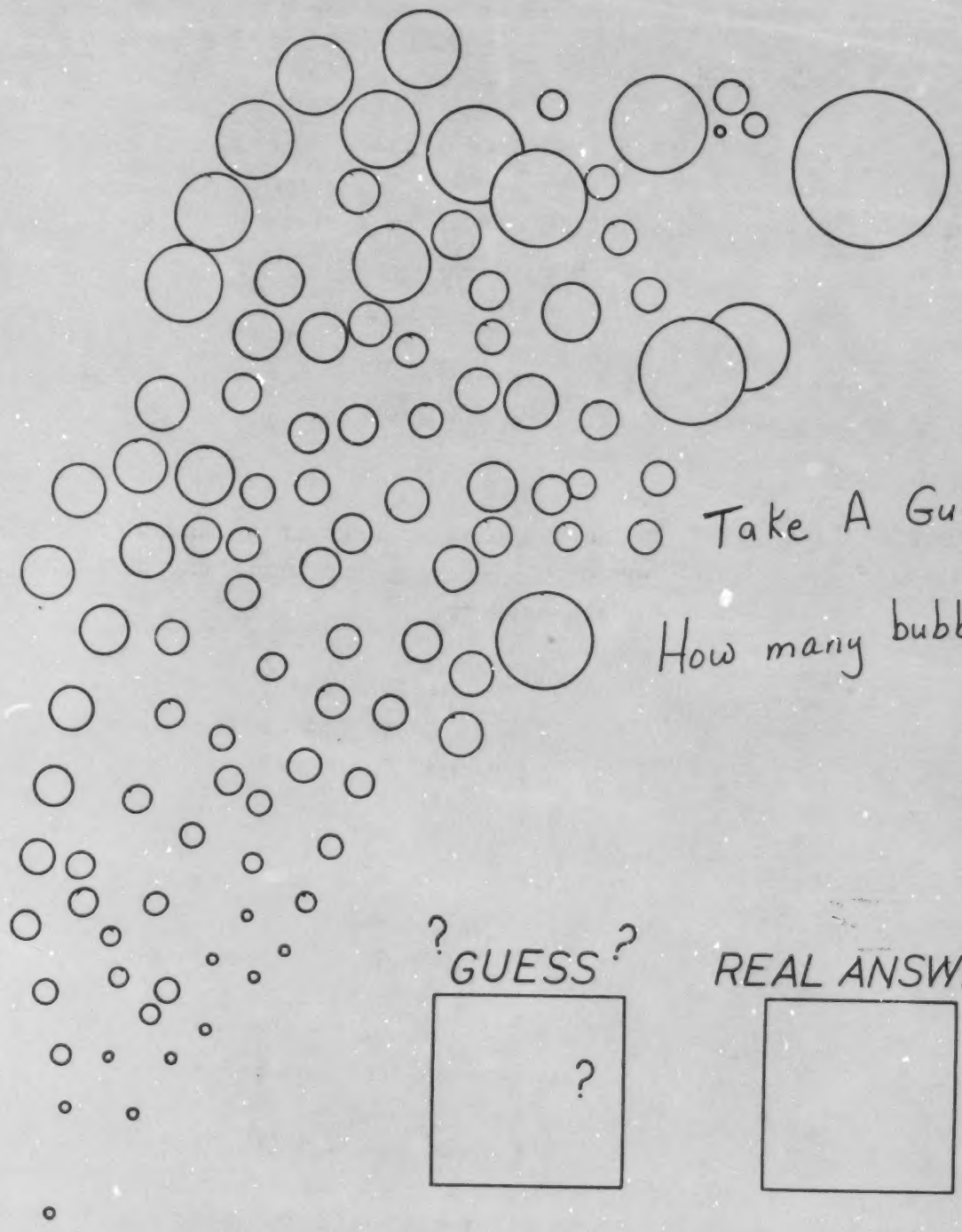


568

141

P.O. 3.01.02.05

NAME: _____ CLASS: _____ DATE: _____



3.01.03 PLACE VALUE THROUGH 9,999

(2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.01.03.01A identify and write 4-digit numbers in expanded notation;
e.g.,
1236 = 1000 + 200 + 30 + 6 = one thousand + two hundreds + three tens + six ones

3.01.03.02A given a 4-digit number in expanded notation, identify and write the number in standard form;
e.g.,
one thousand + two hundreds + three tens + six ones = 1000 + 200 + 30 + 6 = 1236

3.01.03.03B regroup hundreds as thousands;
e.g.,
20 hundreds = 2 thousands

3.01.03.04B regroup thousands as hundreds;
e.g.,
3 thousands = 30 hundreds

3.01.03.05A write 4-digit numbers with a comma between the thousands place and hundreds place.

e.g.,

1234 = 1,234

VOCABULARY

TERMS

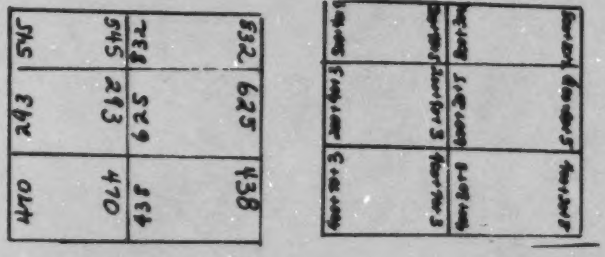
expanded notation
standard form
comma
regroup

GETTING STARTED

Divide the students into three groups (hundreds, tens, and ones). Construct three sets of oaktag cards (each set numbered from one through nine). Distribute the cards randomly to each group so that each student has a number. Say, "The first student from each group please come to the chalkboard." The student from the hundreds group will write his/her number on the chalkboard, e.g., 300. The student from the ten's group will write his/her number on the chalkboard, e.g., 60. The student from the ones group will write his/her number on the chalkboard, e.g., 7. Ask one student to write the standard form, e.g., 367. Repeat this procedure until each student has had an opportunity to come to the chalkboard.

Duplicate sheets like the one drawn below using expanded notation and standard form.

e.g.,



Numbers will appear on each end of the rectangle. Students will cut sheets to form six domino like pieces.

Make several of these sheets for duplication. Divide the students into groups of two. Give each group one set of sheets. Using the individual pieces, the students will play a game matching expanded notation to the standard form.

3.01.03

3.01.03.01 **identify and write 4-digit numbers in expanded notation**

STRATEGY 1: Write 682 on the chalkboard. Ask a student to come to the chalkboard and write the number in expanded notation (600 + 80 + 2). Write 3682 on the chalkboard. Ask a student to come to the chalkboard and write the number in expanded notation (3000 + 600 + 80 + 2).

Repeat this procedure using other numbers.

STRATEGY 2: Divide the students into four groups (thousands, hundreds, tens and ones). Distribute randomly to each student in each group, cards numbered one through nine, ten through ninety, one hundred through nine hundred and one thousand through nine thousand, so that each child in the same group has a different number. Write on the chalkboard eight 4-digit numbers, e.g., 2493. The student in the thousands group who has the number 2000 will come to the chalkboard and write 2000. The student in the hundreds group who has the number 400 will write 400 next to 2000 (2000 + 400). Continue asking the students to come to the chalkboard until the entire number is written in expanded notation. Repeat this procedure until all the numbers have been written in expanded notation.

3.01.03.02 **given a 4-digit number in expanded notation, identify and write the number in standard form**

STRATEGY 1: Prepare four sets of flashcards for thousands, hundreds, tens and ones as follows: 1000, 2000 ...9000; 100, 200 ...900; 10, 20, ...90; 1, 2,...9.

STRATEGY 1: cont'd

Place the cards face down on four labeled desks: thousands, hundreds, tens and ones. Ask a student to pick a card from the thousands desk and write the number on the chalkboard, e.g., 3000. Ask another student to pick a card from the hundreds desk and write that number next to the thousand number, e.g., 3000 + 900. Repeat this procedure with tens and ones, e.g., 3000 + 900 + 80 + 3. Ask a student to write the standard form next to the expanded notation, e.g., 3983.

Repeat this procedure several times.

STRATEGY 2:

Write the following expanded number on the chalkboard: 6000 + 300 + 40 + 7. Point to the plus sign and say, "What does this sign tell us to do? How could we rewrite this expanded number?" Elicit from the students the following example:

$$\begin{array}{r} 6000 \\ 300 \\ 40 \\ +\ \ 7 \\ \hline \end{array}$$

Ask a student to come to the chalkboard and solve the example. Repeat this procedure using other expanded numbers, adding each to solve the example. Elicit from the students that the standard form is found by adding the expanded numbers.

3.01.03.03 regroup hundreds as thousands

STRATEGY 1:

Write on the chalkboard 300, 400, 500. Ask a student to read the three (3) numbers on the chalkboard. Ask another student to come to the chalkboard and write 600, 700, ...900. Say, "Who will come to the chalkboard and write 10 hundred?"

STRATEGY 1: cont'd

Elicit from the students that 10 hundred is written as 10 followed by 2 zeros. Repeat this procedure for 2000, 3000, 5000. Point to 1000 and say, "In what place is the one?" Elicit from the students that the one (1) is in the thousands place. Say, "How can we say 10 hundreds in another way?" Elicit from the students that 10 hundreds is also called one (1) thousand. Repeat this procedure using other 4-digit numbers.

STRATEGY 2:

Prepare 50 hundred squares. Place ten (10) hundred squares, one on top of the other, to form one thousand. Tape together. Count the hundreds as you place them down. Ask a student to come to the chalkboard and add ten hundreds (100 + 100 + ... 100) to show that ten (10) hundreds added together equals one (1) thousand. Write 10 hundreds = 1 thousand on the chalkboard. Repeat this procedure using 20 hundreds, 30 hundreds, 50 hundreds.

3.01.03.04 regroup thousands as hundreds

STRATEGY 1:

Prepare five (5) sets of ten (10) hundred squares taped one on top of another to form thousands blocks. Display a one (1) thousand block. Ask a student to take off the tape and count the number of hundreds squares which makes up the block and is equal to one thousand. Write on the chalkboard, "One thousand (1000) equals 10 hundreds." Repeat this procedure using two (2) thousands and three (3) thousands. Elicit from the students that two (2) thousands equal 20 hundreds and three thousands equal 30 hundreds. Ask students to come to the chalkboard to complete the following.

STRATEGY 2: cont'd

4 thousands = _____ hundreds

6 thousands = _____ hundreds

Write on the chalkboard 600, 500, 700. Ask one student to read the numbers, e.g., 6 hundred, 5 hundred, 7 hundred. Ask another student to underline the numbers in the hundreds places with red chalk, and another student to underline the tens and ones places in blue chalk. Write on the chalkboard 3000, 5000, 7000. Ask one student to underline the tens and ones columns in blue chalk. Ask another student to underline the hundreds and thousands places in red chalk. Say, "How do we read these numbers?" Elicit from the students that these numbers may be read the same way as the first three numbers on the chalkboard, e.g., 30 hundreds, 50 hundreds, 70 hundreds. Write the words next to the numbers. Repeat this procedure using 9000, 8000, 2000.

3.01.03.05 write 4-digit numbers with a comma between the thousands place and hundreds place

STRATEGY 1: Write 4634 on the chalkboard. Say, "When we write 4-digit numbers, we use a comma. We count three places from the right and place the comma between the number in the thousands place and the number in the hundreds place." Ask one student to come to the chalkboard and place the comma in the proper place. Repeat this procedure using the following numbers: 4987, 3942, 8006, 5904.

STRATEGY 2: Prepare four (4) sets of flashcards, each set numbered 1 through 9, and one flashcard with a comma. Ask four (4) students to come to the front

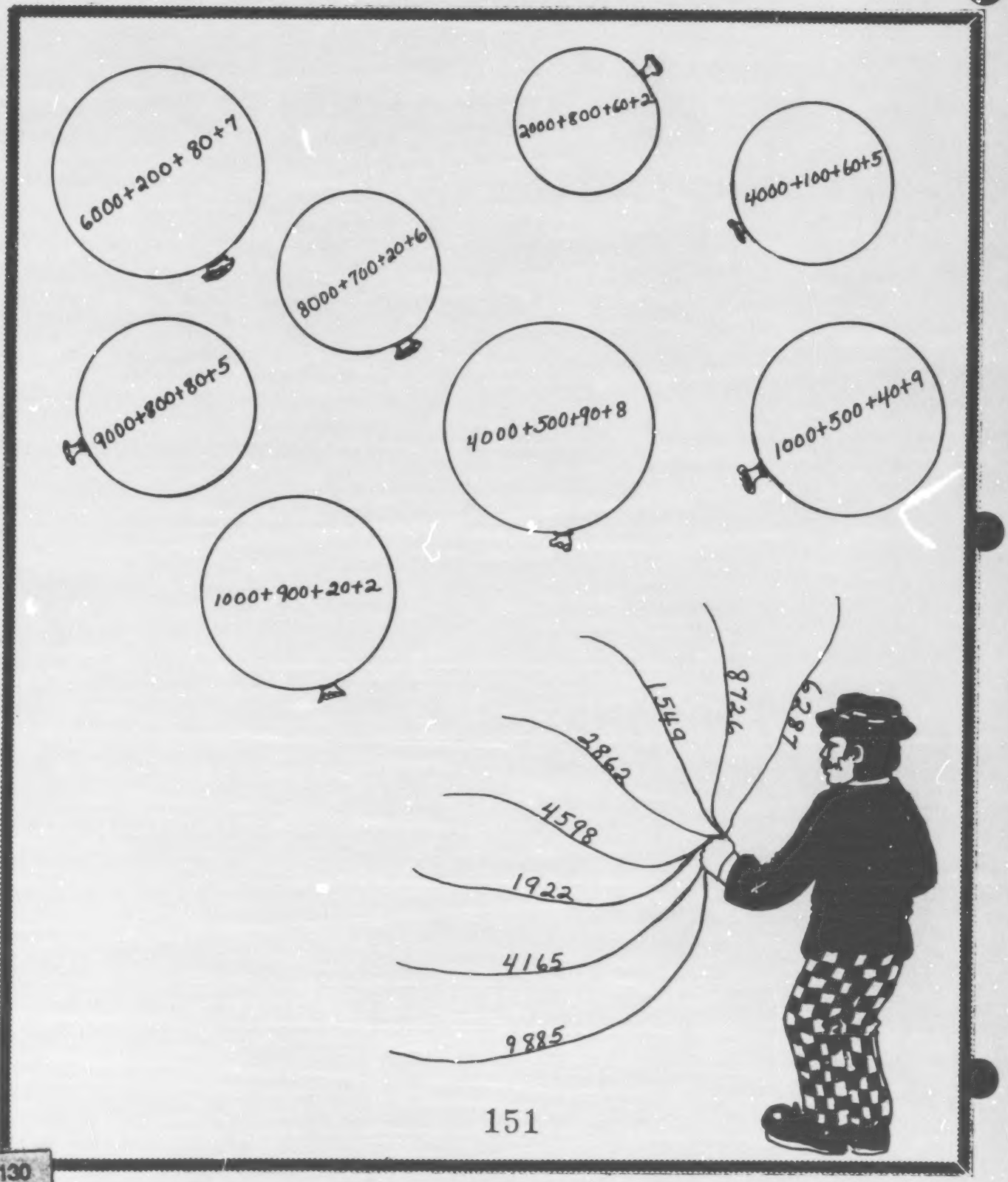
STRATEGY 2: cont'd

of the room and pick a card. Identify each student as a particular place value, e.g., tens, ones, hundreds or thousands. Give the comma card to one child and ask him/her to stand in the correct position in the number. Repeat this procedure using other students.

P.O. 3.01.03.01

NAME: _____ CLASS: _____ DATE: _____

Connect the string to the balloon by matching the standard number with the number in expanded form. Color the picture.



151

P.O. 3.01.03.02

NAME:_____ CLASS:_____ DATE:_____

Cut out the cards on these pages. Use the pieces for our Domino Game.
Try to use up your pieces before your partner does.

5,406	7,321	6,843	4,327
5000+400+6	7000+300+20+1	6000+800+40+3	4000+300+20+7

P.O. 3.01.03.02

NAME: _____ CLASS: _____ DATE: _____

Cut out the cards on these pages. Use the pieces for our Domino Game.
Try to use up your pieces before your partner does.

5,949

2,936

1,005

4,290

5000+900+40+9

2000+900+30+6

1000+5

4000+200+90

6+40+900+5000

9+30+900+2000

5+1000

90+200+4000

154

155

P.O. 3.01.03.02

NAME: _____ CLASS: _____ DATE: _____

Cut out cards on these pages. Use the pieces for our Domino Game.
Try to use up your pieces before your partner does.

9000+800+20	3000+40+2	2000+100+5	6000+90+3
9000+800+20	3000+40+2	2000+100+5	6000+90+3
9,820	3,042	2,105	6,093
9,820	3,042	2,105	6,093

P.O. 3.01.03.03/.04

NAME: _____ CLASS: _____ DATE: _____

(1) Regroup the hundreds into thousands
(2) Regroup the thousands into hundreds

(1) Sample: 53 hundreds = 5300

28 hundreds = _____

16 hundreds = _____

49 hundreds = _____

82 hundreds = _____

60 hundreds = _____

---

(2) Sample: 5700 = 57 hundreds

8300 = __ hundreds

6000 = __ hundreds

1300 = __ hundreds

3100 = __ hundreds

2500 = __ hundreds

P.O. 3.01.03.05

NAME:_____ CLASS:_____ DATE:_____

(1) You will be a comma detective.
Cross out all the numbers that have the comma in the wrong place.
(2) Put commas where they belong.

1.

3,43	98,27
6,492	3,648
83,47	21,9
6,8	85,0
4,200	6,942
386,8	308,

2.

325	468
4963	8315
38	42
9000	7985
2120	319

3.02.01 ADDITION OF 3-DIGIT NUMBERS

(2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.02.01.01A check addition of 3-digit numbers using subtraction;
e.g.,

	check
516	838
+322	-322
838	516

3.02.01.02A determine whether a sum is even or odd;
e.g.,

146
+123
269

Is the sum 269, even or odd?
269 is an odd number.

3.02.01.03A solve word problems related to skills learned in this module.
e.g.,

Mr. Jones drove 162 miles one day and 217 miles another day. How many miles did he drive altogether?

	check
162	379
+217	-217
379 miles	162

3.02.01

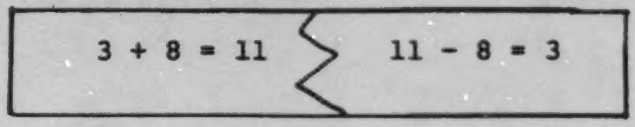
VOCABULARY

TERMS

check
total
odd
even

GETTING STARTED

On large index cards, prepare a set of puzzle pieces with related addition and subtraction equations. Do not cut any two (2) sets identically. Color code the addition and subtraction sides. The parts should fit together like pieces of a puzzle. Cards fitting together perfectly contain number sentences which are a pair.
e.g.,



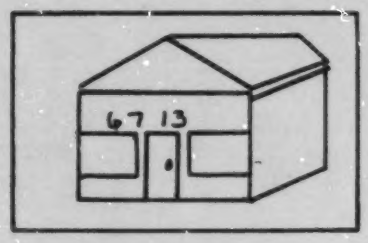
Demonstrate the game a few times, after which students can work in small groups of four or five students. Instruct the students in the rules of the game:

1. Each student has a turn.
2. Each student picks from the pile of addition cards which are face down, and looks at the addition example written.
3. He/she then guesses what the related subtraction sentence will be and looks for that card in the subtraction card pile. If the cards fit together perfectly, the student gets a point. (Designate one (1) student in each group to be the score-keeper.)

Helpful Hint: Cover the cards with clear contact paper. This gives the material a longer life.

GETTING STARTED (continued)

Draw a house on a transparency, poster board, or on the chalkboard.
e.g.,



Say, "A family lives in each of these houses. The name of each family is pasted over the door. How can we write these numbers so they form a number sentence?" Elicit that 6 + 7 = 13 and ask a student to record on the wall of the house. Say, "What is another way to write this number sentence?" Elicit that 7 + 6 = 13 and ask another student to record on the house. Ask, "How can we form a subtraction sentence for 6 + 7 = 13?" Repeat this procedure for 7 + 6 = 13. Write the following on the chalkboard.
e.g.,

6 + 7 = 13 relates to 13 - 7 = 6
7 + 6 = 13 relates to 13 - 6 = 7

Repeat this procedure using other houses.

Reinforce:
1. All the number sentences in each family use the same numbers.
2. There are two (2) addition and two (2) subtraction sentences in each family.
3. For each addition sentence, there is a related subtraction sentence.

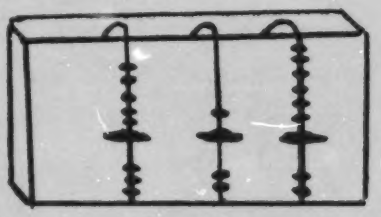
3.02.01

3.02.01.01 **check addition of 3-digit numbers using subtraction**

STRATEGY 1: Write an addition problem using two 3-digit numbers on the chalkboard, e.g., 516 + 322. Display the same problem on an abacus.

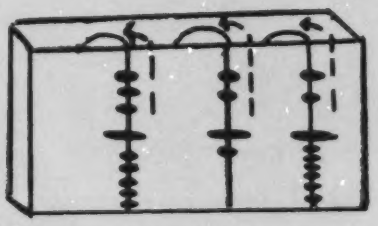
e.g.,

- = clip



Say, "What is the sum of 516 and 322?" Ask a student to write the answer on the chalkboard. Direct a student to remove the clips. Elicit the total by counting ones, tens and hundreds with the class. Let a student record the answer on the chalkboard, e.g., 838. Say, "Now we are going to form a subtraction problem using the same numbers. What is the total? What number is displayed on the abacus?" Write 838 on the chalkboard. Say, "We're going to subtract 322 from 838. Can you guess what the answer will be?" Elicit 516. Say, "Let's check our answer." Demonstrate by putting the clips back in the place. 322 will appear at the top half of the abacus. Flip the 322 to the back of the abacus.

e.g.,



Say, "What number remains?" (516)

Repeat this procedure using other addition examples.

STRATEGY 2: Write the following examples and answers on the chalkboard.

Joe	Mary
516	516
+322	+322
948	838

Say, "Joe and Mary were working on the same problem. Their answers are different. How can they check their work to see whose answer is correct?" Elicit from the students that to check an addition problem, you must subtract one addend from the sum. Ask the students to check the problem in their notebooks. Say, "Which student had the correct answer? How do you know?" Ask a student to come to the chalkboard and demonstrate the check,

e.g.,

Joe	check	Mary	check
516	948	516	838
+322	-322	+322	-516
948	626	838	322

3.02.01.02 determine whether a sum is odd or even

STRATEGY 1: Ask six (6) students to come to the front of the room and instruct each student to take a partner. Say, "How many students are there?" Ask a student to count the students at the front of the room by twos. Say, "Are any of the students left without a partner?" Record the information on the chalkboard.

e.g.,

How many students?	Were any left?
6	no
9	yes
5	yes

Repeat using different numbers of students.

STRATEGY 1: cont'd

Say, "Which number had no students left? We call this number an even number. Which numbers did have a student left without a partner?" Elicit that these numbers are odd numbers.
Write an addition example on the chalkboard.
e.g., 146
+123
Call a student to the chalkboard to write the answer. Say, "In which place value must we always look to decide if the answer is odd or even? (ones) Is the answer to this example odd or even?" Write odd next to the answer.

Repeat this procedure using other examples. Students can complete the work on additional examples in their notebooks.

STRATEGY 2:

Write the following on the chalkboard.
e.g.,

$$\begin{array}{r} 146 \\ +123 \\ \hline 269 \end{array}$$

Say, "Here is an addition example. What is the answer? Is the answer odd or even?" Elicit that it is odd, and write odd next to the answer. Say, "At which place do we always look to find out if the number is odd or even?" (ones) Write the following on the chalkboard: 1) Find each sum; 2) look at the ones place to determine whether the sum is odd or even; 3) write odd or even next to your answer. Write several examples on the chalkboard. Ask the students to record and complete the examples in their notebooks.

3.02.01.03 solve word problems related to skills learned in this module

STRATEGY 1: Write a word problem on the chalkboard.
e.g.,

> Mr. Jones drove 162 miles one day and 217 miles another day. How many miles did he drive altogether?

Say, "What must we do to solve a word problem?" Elict that we must first read the problem and look for important facts and key words before we solve the problem. Reinforce the steps to be taken in solving a problem by recording the rules on a bulletin board. Ask the students to write the rules in their notebooks.

How To Solve Word Problems

1. Read the problem.
2. Choose important facts. (numbers)
   What does the problem ask?
   What does the problem tell?
   Look for key words. (altogether, were left)
3. Estimate your answer.
4. Write a number sentence.
5. Solve the number sentence
6. Label your answer. (15 birds)
7. Check. Did you answer the question?

To reinforce the steps taken to solve word problems, ask students to follow each step for the stated problem. The solved number sentence should be written on the chalkboard. Say, "How will we check the answer?" Ask a student to come to the chalkboard to check the problem.

STRATEGY 2: Prepare on index cards a set of word problems. Use a different student's name on each card, e.g., "Jane has 437 marbles. Her brother gave her 211 more. How many marbles does Jane have altogether? Check your answer." In addition, prepare an extra card whose problem involves a character, e.g., Snoopy, Smurf. Write the Snoopy problem on the chalkboard. Solve and check this problem by eliciting the answers from the students. Reinforce the method of checking by asking a student to check the example at the chalkboard, while the rest of the students check the example in their notebooks. Say, "I have written a story problem about each of you. I did not complete the story. Each of you will complete your own story. When you finish, you may trade with your neighbor." Ask the students to write an example in their notebooks.

P.O. 3.02.01.01

NAME:_____ CLASS:_____ DATE:_____

Find each sum. Check each answer.

385 +412 797	check 797 -412 385	151 +203	check
417 +132	check	365 +436	check
318 +482	check	427 +118	check
254 +219	check	582 +267	check

P.O. 3.02.01.02

NAME: _____ CLASS: _____ DATE: _____

Remember to look at the numeral in the ones place to see if the number is odd or even.

FIND EACH SUM. THEN CHECK THE CORRECT BOX TO SHOW IF THE SUM IS ODD OR EVEN.

402 +113	☐ odd ☐ even	418 +214	☐ odd ☐ even
203 +417	☐ odd ☐ even	117 +219	☐ odd ☐ even
694 +135	☐ odd ☐ even	213 +258	☐ odd ☐ even
239 +149	☐ odd ☐ even	414 +292	☐ odd ☐ even
296 +102	☐ odd ☐ even	813 +138	☐ odd ☐ even

P.O. 3.02.01.03

NAME: _____ CLASS: _____ DATE: _____

Solve each problem. Then check your answer.

	Work	Check
(1) On Sunday morning 419 people went to the circus. On Monday 208 people went. How many people went on both days?		
(2) The Road Runner ran 122 miles in the morning and 319 miles in the evening. How many miles did he run in all?		
(3) Dumbo the elephant ate 250 peanuts. His friend Elmer ate 128 peanuts. How many peanuts did the elephants eat altogether?		
(4) The ice cream man sold 135 cones on Grove Street. He sold 215 cones on Elm Street. How many cones did he sell altogether?		
(5) Popeye ate 157 cans of spinach last year. This year he ate 217 cans. How many cans of spinach did he eat in all?		

170

3.02.02 ADDITION OF 3-DIGIT NUMBERS WITH ONE REGROUPING (EXCHANGE) ONES TO TENS

(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.02.02.01B add two 3-digit numbers with one regrouping (exchange) and check; e.g.,

	1		check
	2	2 3	391
+1	6	8	-168
3	9	1	223

3.02.02.02B solve word problems related to skills learned in this module.
e.g.,

Ann and Mike collected 384 baseball cards. Louise collected 106 cards. They decided to combine their collection of baseball cards. How many cards did they have in all?

	1			check
3	8	4		490
+1	0	6		-106
4	9	0	baseball cards	384

3.02.02

VOCABULARY

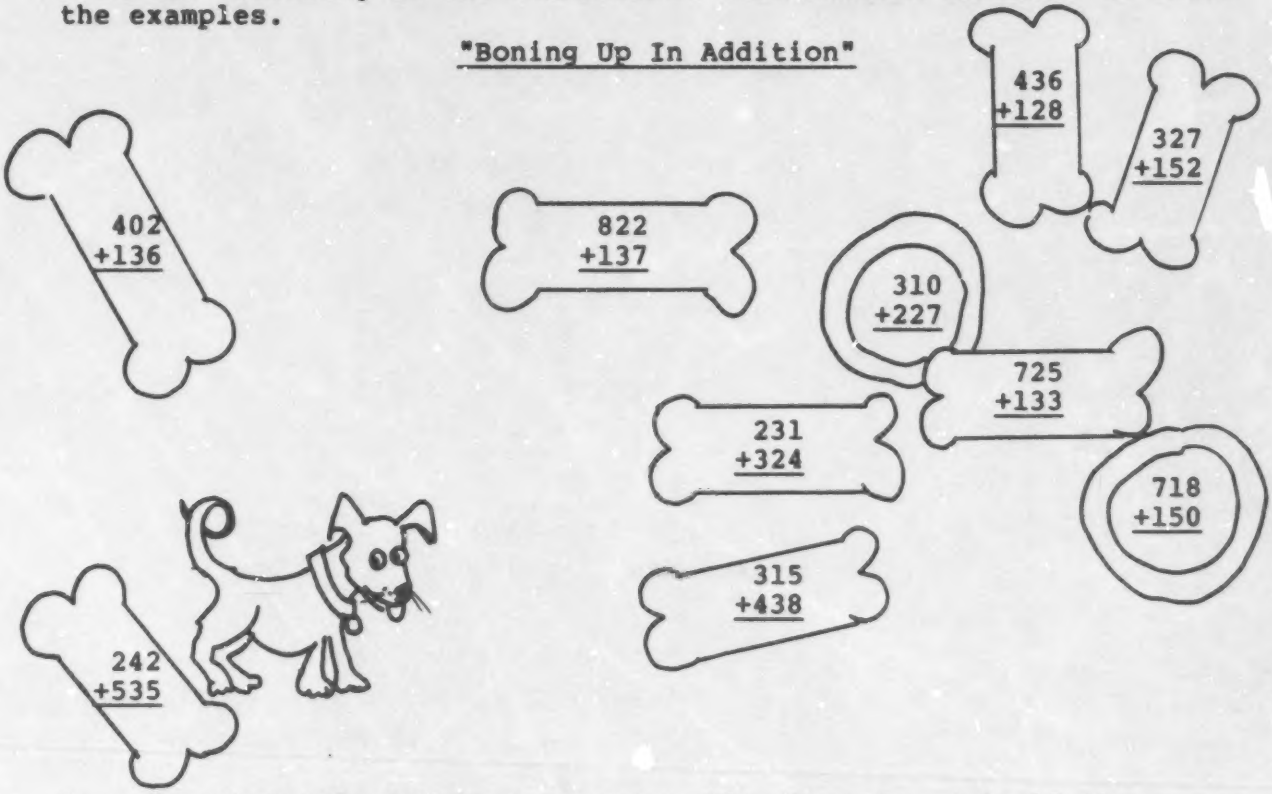
TERMS

regrouping

GETTING STARTED

Draw the following on the chalkboard. Ask several students to solve the examples.

"Boning Up In Addition"



Say, "In what column do we start to add? What do we do if there are more than 9 ones in the ones column?" Elicit that we regroup 1 ten for 10 ones. Ask the students to check each example.

GETTING STARTED cont'd

Ask the students to do the following examples in their notebooks.

1)	2)	3)	4)	5)
469	273	806	743	949
+ 26	+ 19	+ 58	+ 39	+ 36

Call upon one student to do the first example on the chalkboard. Ask the student to explain to the class what he/she is doing as he is doing it. When he/she regroups, ask him, "Why?" Repeat with the remaining examples asking other students to come to the chalkboard.

3.02.02

3.02.02.01 **add two 3-digit numbers with one regrouping (exchange) and check**

STRATEGY 1: Write the following on the chalkboard.

	hundreds	tens	ones
	3	2	8
+	1	4	5

Present one jar with red marbles, beans or macaroni labeled "ones" and one jar with another color marbles, different beans or macaroni labeled "tens." Ask a student to take eight (8) items from the ones jar. Point to the 8 in the example. Then ask the student to take five (5) items from the same jar. Point to the 5 in the example. Ask the student to count how many items he/she has (13). Ask the student what he can do to make it easier to carry his items. Say, "Can he/she exchange some of his items so that he/she holds fewer items but maintains the same value?" Elicit that 13 ones can be exchanged for 1 ten and three ones. Write 13 = 10 + 3 or 1 ten + 3 ones. Write the 3 ones in the ones column and the 1 ten in the tens column. Continue to add the example. Repeat using other examples.

e.g.,

1)	2)	3)	4)	5)
468	718	425	835	819
+123	+127	+136	+147	+131

Say, "How do you know if your answers are correct?" Elicit that the answers can be checked by a subtraction example. Select five students and ask each to show, at the chalkboard, the check for one of the above examples.

STRATEGY 2: cont'd

Prepare and distribute 5 hundred squares, 7 ten strips and 14 ones to each student. Write the following on the chalkboard.

hundreds	tens	ones
3	2	6
+2	4	8

Solve the example with the students. Ask the students to add 6 and 8 using the squared material. Write 14 in the ones column. Ask the students to do the same with the numbers in the tens and hundreds columns. Say, "What is wrong with this answer?" Elicit that only one digit is permitted in each column. Ask the students what can be done to correct the problem. Elicit that you can exchange 10 ones pieces for 1 ten strip. Ask the students to move their pieces accordingly and continue to add the example. Write the correct answers on the chalkboard.

Repeat this procedure using the examples below.

1)	2)	3)	4)	5)
327	219	382	237	116
+134	+103	+109	+248	+154

Say, "How do we know these answers are correct? What operation do we use to check an addition example?" (subtraction) Ask five students to do the check on the chalkboard and explain how it is done.

3.02.02

3.02.02.02 **solve word problems related to skills learned in this module**

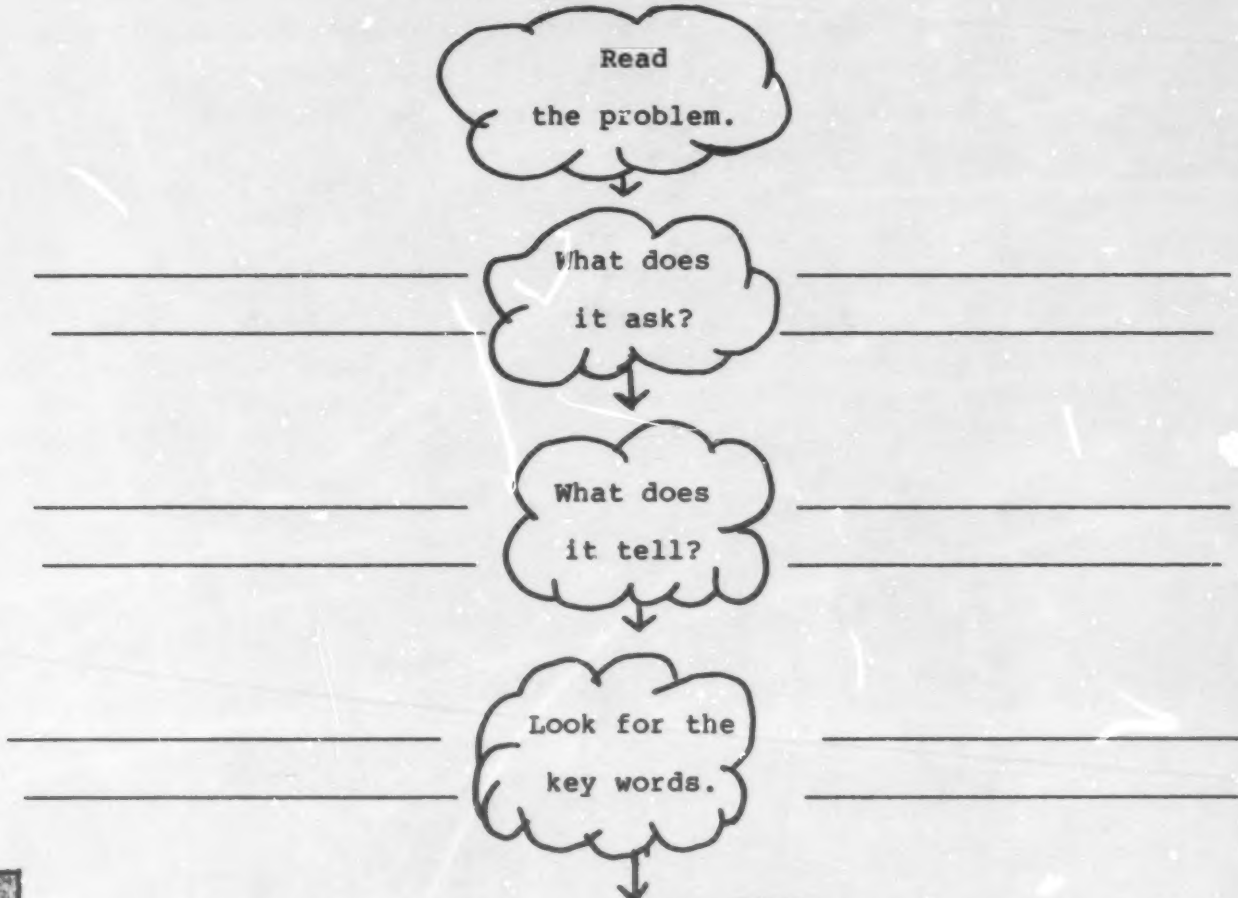
STRATEGY 1: Discuss the following key phrases for addition.

1. What's the total?
2. How many in all?
3. How many altogether?
4. What is the sum?
5. How much?

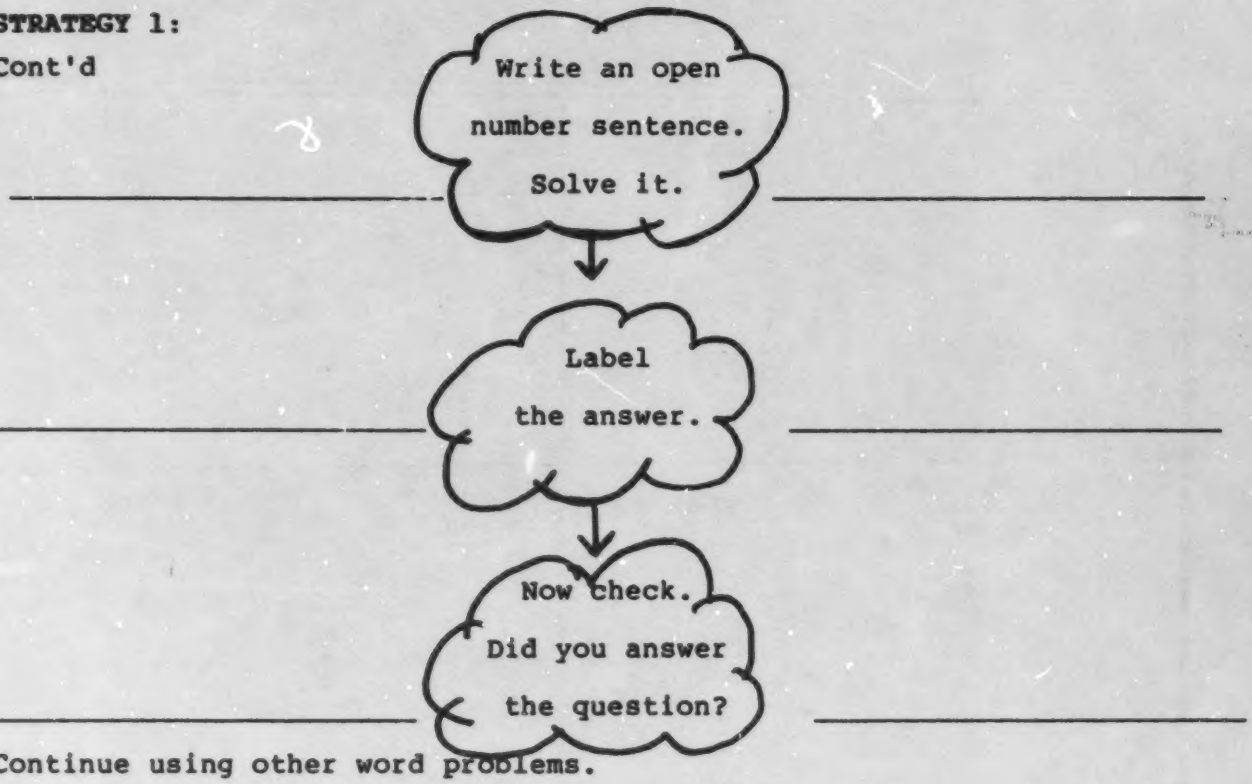
Present the following word problem.

John saved 327 baseball cards
and 218 football cards.
How many cards did he save
in all?

Ask the students to analyze the problem according to the following chart.



STRATEGY 1:
Cont'd



Continue using other word problems.

STRATEGY 2: Review the following key phrases for addition.

1. What's the total?
2. How many in all?
3. How many altogether?
4. What is the sum?
5. How much?

Ask a student to make up a word problem and to present it to the group. The problem is to be limited to addition in the hundreds with exchange of ones to tens only. Instruct the other students to solve the problem in their notebooks and write the key phrases which indicate addition is the operation to use. Ask a student to share his/her answer.

Continue asking students to present word problems and repeat the above procedure for each.

P.O. 3.02.02.01

NAME:_____ CLASS:_____ DATE:_____

Find each sum and check.

314 + 227 541 check 541 - 227	538 + 232 check
615 + 156 check	405 + 108 check
219 + 279 check	116 + 247 check
215 + 139 check	347 + 123 check

P.O. 3.02.02.02

NAME:_____CLASS:_____DATE:_____

Read each problem. Underline the key phrases. Solve.

1. Sue sold 324 movie tickets to one theatre and 416 tickets to another theatre. How many tickets did she sell all together?_____

2. Michael saved 627 marbles. John saved 235 marbles. How many marbles were saved in all?_____

3. Juan ate 326 peanuts. Mary ate 238 peanuts. What is the total number of peanuts eaten?_____

4. Judy saved 724 pennies. Her sister saved 239 pennies. How many pennies did they save altogether?_____

5. Sam collected 232 baseball cards. Howard collected 138 baseball cards. How many cards were collected in all?_____

3.14.03 SUBTRACTION WITH REGROUPING ONES FOR TENS

(ongoing)

PERFORMANCE OBJECTIVES

The student will be able to...

3.14.03.01 subtract a 1-digit number from a 3-digit number with one exchange and check;
e.g.,

	check
373	364
-9	+9
364	373

3.14.03.02 subtract a 2-digit number from a 3-digit number with one exchange and check;
e.g.,

	check
425	409
-16	+16
409	425

3.14.03.03 subtract a 3-digit number from a 3-digit number with one exchange, tens to ones and check;
e.g.,

	check
813	608
-205	+205
608	813

3.14.03.04 solve word problems related to skills learned in this module.

e.g.,

Bill has 15 marbles. He needs 194 to complete his collection. How many more marbles does Bill need?

VOCABULARY

subtrahend
minuend
difference

GETTING STARTED

Prepare and distribute 3 x 3 grids with the numbers filled in.
e.g.,

6	3	
4	2	

Ask student to subtract across and down.
e.g.,

6	3	3
4	2	2
2	1	1

Repeat this procedure by asking the students to prepare their own grids and give the grid to a neighbor to subtract.

Prepare subtraction fact flashcards. Divide the class into two (2) teams, A and B. Ask the first two (2) members of each team to come to the chalkboard. Display a flashcard, e.g., 7 - 4 = . The student who writes the answer first gets one point for his/her team. Repeat this procedure until one team reaches 20 points.

3.14.03.01 subtract a 1-digit number from a 3-digit number with one exchange and check

STRATEGY 1: Using manipulatives such as bundles of tens or colored rods, ask the students to set-up the problem at their desks that you put on the chalkboard.

e.g.,

$$\begin{array}{r} 242 \\ -\ \ 5 \\ \hline \end{array}$$

2 hundreds 4 tens 2 ones

5 ones

Say, "We cannot take 5 ones from 2 ones. We must exchange 1 ten for ones." Ask a student how many ones are in 1 ten. Elicit 10. Write 242 on the chalkboard. $\begin{array}{r} -\ \ 5 \\ \hline \end{array}$

Say, "When we take 1 ten from 4 tens, we have 3 tens left. When we add 10 ones to our 2 ones, we have 12 ones." Ask the students to complete the problem by subtraction. Elicit the following.

$$\begin{array}{r} {\scriptstyle 3\,12} \\ 2\not{4}\not{2} \\ -\ \ 5 \\ \hline 237 \end{array}$$

Say, "When we check an addition problem, we add from the bottom up. We do the same for subtraction."

e.g.,

$$\begin{array}{r} 242 \\ -\ \ 5 \\ \hline 237 \end{array}$$ add

Explain, "Your answer will be the minuend."

e.g.,

$$\begin{array}{r} 242 \leftarrow \text{same} \\ -\ \ 5 \\ \hline 237 \quad \text{add} \\ \hline 242 \leftarrow \end{array}$$

Repeat this procedure using various subtraction examples with 3- and 1-digit numbers.

STRATEGY 2: Write subtraction problems on index cards.

e.g.,

$$\begin{array}{r} 343 \\ -\ \ 7 \\ \hline \end{array}$$

Write one problem on the chalkboard. Say that we cannot take 7 ones from 3 ones. Ask what we can do to subtract. Elicit that we must exchange 1 ten for 10 ones. Show and say, "This leaves 3 tens and we now have 13 ones."

e.g.,

$$\begin{array}{r} 3\,\not{4}\,\not{3} \\ -\ \ 7 \\ \hline \end{array}$$

Ask the students to solve the problem. Elicit that the answer is 336. Say, "We want to be sure we are correct. To check our problem, we must add our answer and the subtrahend."

e.g.,

$$\begin{array}{r} 343 \\ -\ \ 7 \\ \hline 336 \end{array}$$

Write 336 on the chalkboard. Say, "The sum in our check should be the same as the minuend in our example."

e.g.,

$$\begin{array}{r} 343 \\ -\ \ 7 \\ \hline 336 \end{array} \quad \text{same} \quad \begin{array}{r} 336 \\ +\ \ 7 \\ \hline 343 \end{array}$$

Distribute other index cards and repeat this procedure with other subtraction examples.

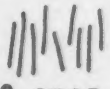
3.14.03.02 subtract a 2-digit number from a 3-digit number with one exchange and check

STRATEGY 1: Prepare and distribute to each student squared material in ones, tens and hundreds. Write a subtraction problem on the chalkboard.

STRATEGY 1: cont'd

e.g., 347

- 29



Say, "We cannot take 9 ones from 7 ones. We must move 1 ten over to the ones. How many ones are in 1 ten?" Elicit 10. Ask the students to exchange the 1 ten for 10 ones. Say, "How many ones do we now have in the ones column?" Elicit 17 and write 3~~4~~17 on the chalkboard.

- 29

Ask the students to complete the subtraction. Ask a student to write the answer on the chalkboard.

e.g.,

3~~4~~17
- 29
318

Say, "When we check subtraction, we add our answer to to the subtrahend.

e.g.,

318
+ 29

Our answer (sum) should be the same as the original minuend."

e.g.,

347 ← same → 318
- 29 + 29
318 347

Repeat this procedure using various subtraction examples.

STRATEGY 2: Write a subtraction example on the chalkboard.

e.g.,

272
- 57

Say, "We cannot take seven ones away from 2 ones. Therefore, we must exchange one ten for 10 ones."

STRATEGY 2: cont'd

Write the following on the chalkboard.

$$\begin{array}{r} {}^{6}\not{7}\,{}^{1}\not{2} \\ -\ 57 \\ \hline \end{array}$$

Say, "When we take 1 ten from 7 tens, we have 6 tens left. When we add 10 ones to 2 ones, we have 12 ones." Ask a student to do the subtraction.

e.g.,

$$\begin{array}{r} {}^{6}\not{7}\,{}^{1}\not{2} \\ -\ 57 \\ \hline 215 \end{array}$$

Say, "To check a subtraction example we add the answer to the subtrahend."

e.g.,

example	check
272	215
− 57	+ 57
215	

Say, "Your sum should be the minuend."

e.g.,

example		check
272	same	215
− 57		+ 57
215		272

Write various subtraction examples using 3- and 2-digit numbers with one exchange and repeat the above procedure.

3.14.03.03 **subtract a 3-digit number from a 3-digit number with one exchange, tens to ones and check**

STRATEGY 1: Adapt Strategy 1 used in P.O. 3.14.03.01 for subtraction of a 3-digit number.

STRATEGY 2: Prepare and distribute squared material in ones, tens and hundreds to each student. Write a subtraction problem on the chalkboard.

e.g.,

$$\begin{array}{r} 637 \\ -219 \\ \hline \end{array}$$

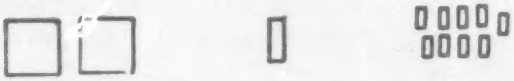
Ask the students to illustrate the problem using manipulatives.

e.g.,

637

6 hundreds 3 tens 7 ones

-219



2 hundreds 1 ten 9 ones

Say, "We cannot take 9 ones from 7 ones. We must move 1 ten over to the ones. How many ones are in 1 ten?" Elicit 10. Ask the students to exchange 1 ten for 10 ones. Say, "How many ones do we now have in the ones column?" Elicit 17 and write it on the chalkboard.

e.g.,

$$\begin{array}{r} {}^{2}\not{6}\,{}^{1}\not{3}\not{7} \\ -219 \\ \hline \end{array}$$

Ask the students to complete the subtraction. Ask a student to write the answer on the chalkboard.

e.g.,

$$\begin{array}{r} {}^{2}\not{6}\,{}^{1}\not{3}\not{7} \\ -219 \\ \hline 418 \end{array}$$

Say, "When we check subtraction, we add our answer to the subtrahend."

e.g.,

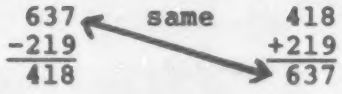
$$\begin{array}{r} 418 \\ +219 \\ \hline \end{array}$$

Say, "Our answer (sum) should be the same as the original minuend."

3.14.03

STRATEGY 2: cont'd

e.g.,



Repeat this procedure using various subtraction examples.

3.14.03.04 **solve word problems related to skills learned in this module**

STRATEGY 1: Write the following on the chalkboard.

Jim had 132 pennies.
He gave 18 pennies to John.
How many pennies does he have left?

Ask a student to come to the chalkboard and write the example to solve the problem.

e.g.,

$$\begin{array}{r} 132 \\ -\ 18 \\ \hline \end{array}$$

Say, "What words helped you to decide?" Elicit gave, how many left. Ask another student to estimate the answer by rounding.

e.g.,

$$\begin{array}{r} 130 \\ -\ 20 \\ \hline 110 \end{array}$$

Ask another student to solve the example.

e.g.,

$$\begin{array}{r} 132 \\ -\ 18 \\ \hline 114 \end{array}$$

Say, "Was our estimate close to our answer? Check your answer."

Repeat this procedure using varous subtraction word problems.

STRATEGY 2: Prepare and distribute to each student a word problem on index cards. Ask the students to read the cards.

e.g.,

Stu has 212 baseball cards.
He gave 9 to his friend.
How many does he have left?

Ask the students to make a chart in their notebooks based on their problem.

e.g.,

Given Information	Question	Number Sentence
212 cards 9 cards	How many left?	212 - 9

Ask the students to fill in the chart.

Repeat this procedure by asking the students to exchange cards.

P.O. 3.14.03.01

NAME: _____ CLASS: _____ DATE: _____

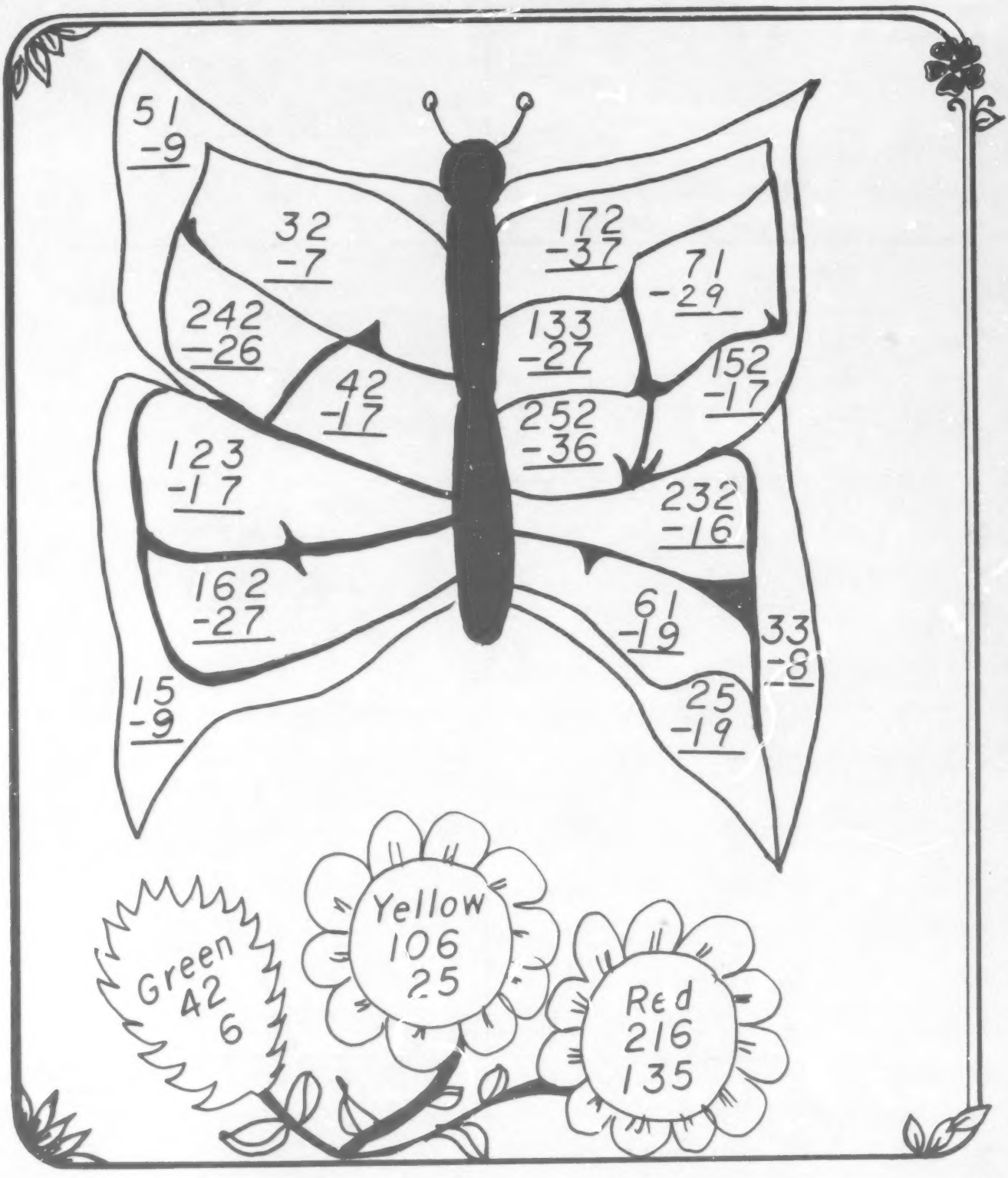
Solve and check

Example $3\overset{3}{4}2 - 7 = 335$ 342 check	$635 - 8$
$111 - 6$	$431 - 8$
$471 - 5$	$241 - 6$
$832 - 7$	$963 - 6$
$421 - 8$	$121 - 5$

P.O. 3.14.03.02

NAME:_____ CLASS:_____ DATE:_____

Subtract. Use the key to color the butterfly.



P.O. 3.14.03.03

NAME: _____ CLASS: _____ DATE: _____

Solve and check.

Example $3\overset{2}{3}\overset{1}{2}$ -117 215 332 check	662 -235
421 -218	575 -328
753 -438	483 -129
523 -118	832 -425
193 -168	731 -423

P.O. 3.14.02.04

NAME: _____ CLASS: _____ DATE: _____

Solve and check each word problem.

EXAMPLE

You have 113 jelly beans. You give 8 to your friend. How many do you have left?

$$\begin{array}{r} 113 \\ -\ 8 \\ \hline 105 \end{array}$$

check

$$\begin{array}{r} 105 \\ +\ 8 \\ \hline 113 \end{array}$$

You have 423 marbles. If you give sue 17, how many will you have left?

check

If you have 233 pennies and give your sister 28, how many will you have left?

check

If you have 452 baseball cards and you give 137 to your friend, how many will you have left?

check

If you baked 144 cookies. You sold 128 at the lake sale, how many will you have left?

check

You are putting cans on the shelf in a store. You have 373 cans, the shelf hold 347 cans, how many cans will you have left over?

check

You are stacking books at the library. If you have 252 books and the stack holds 247 books, how many books are left over?

check

If the tree has 572 leaves and 458 leaves fall, how many are still on the tree?

check

3.03.01 SUBTRACTION WITH ONE REGROUPING (EXCHANGE) TENS TO ONES

(2-3 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.03.01.01B subtract up to 4-digit numbers with one regrouping (exchange) of tens to ones and check;

e.g.,

$$\begin{array}{r} {}^{4}\cancel{2}{}^{1}\cancel{5}7 \\ -129 \\ \hline 128 \end{array} \qquad \begin{array}{r} \text{check} \\ 128 \\ +129 \\ \hline 257 \end{array}$$

$$\begin{array}{r} {}^{8}4{}^{1}\cancel{9}\cancel{9}3 \\ -2877 \\ \hline 2116 \end{array} \qquad \begin{array}{r} \text{check} \\ 2116 \\ +2877 \\ \hline 4993 \end{array}$$

3.03.01.02B compute subtraction examples with one regrouping (exchange) having minuends to $9.99 and check;

e.g.,

$$\begin{array}{r} \$9.63 \\ -6.45 \\ \hline \$3.18 \end{array} \qquad \begin{array}{r} \text{check} \\ \$3.18 \\ +6.45 \\ \hline \$9.63 \end{array}$$

3.03.01.03B solve word problems related to skills learned in this module.

e.g.,

Arthur had 356 stamps in his collection. He gave 127 stamps to his sister. How many stamps does Arthur have left?

$$\begin{array}{r} {}^{4}1{}^{1}6 \\ 3\cancel{5}\cancel{6} \\ -127 \\ \hline 229 \end{array} \text{ stamps}$$

VOCABULARY

TERMS

regrouping

GETTING STARTED

Distribute squared material to the students. Write 31 on the chalkboard.
-16

Ask the students to take out 3 ten strips and one unit square. Say, "Are we able to take 6 ones from these strips?" Elicit from the students that one tens strip must be exchanged for 10 units in order to subtract 6. Ask one student to come to the chalkboard to write the answer.

Repeat this procedure using several examples. Check each example by using addition.

Divide the class into two (2) groups with 5 children being Tens and the rest being Ones. Write 43 on the chalkboard.
-19

Ask 4 Tens students and 3 Ones students to come to the front of the room. Say, "Can we take 9 ones away from 3 ones?" Elicit from students that you must regroup since you cannot take 9 ones from 3 ones. Ask 10 Ones students to come up to replace 1 Ten student who will sit down. Ask one student to move the children and show the subtraction and then write the answer on the chalkboard. Repeat this procedure using other examples. Ask a child to check each example using addition.

3.03.01.01 **subtract up to 4-digit numbers with one regrouping (exchange) of tens to ones and check**

STRATEGY 1: Distribute squared material to the students. Write the following example on the chalkboard.

e.g.,

$$\begin{array}{r} 621 \\ -219 \\ \hline \end{array}$$

Ask the students to use the squared material to show 621 (6 hundreds, 2 tens, 1 one). Say, "Can we take 219 from this material?" Elicit that one ten must be exchanged for ten ones in order to subtract in this example. Ask one student to come to the chalkboard to write the answer while the students use the squared material to exchange and subtract. Check the answer on the chalkboard against the squared material. Repeat this procedure using other examples with regrouping from tens to ones. When the students are familiar with regrouping, ask them to solve the following examples without the use of squared materials and check by addition.

e.g.,

$$\begin{array}{r} 4993 \\ -2877 \\ \hline \end{array} \qquad \begin{array}{r} 493 \\ -247 \\ \hline \end{array}$$

STRATEGY 2: Write the following on chalkboard.

e.g.,

$$\begin{array}{r} 4782 \\ -2359 \\ \hline \end{array}$$

Ask a student to write each number in expanded notation.

e.g.,

$$\begin{array}{r} 4000 + 700 + 80 + 2 \\ -2000 + 300 + 50 + 9 \\ \hline \end{array}$$

Elicit from the students that we must regroup in order to subtract. Ask one student to come to the chalkboard, take one ten, leaving 70, and exchange

STRATEGY 2: cont'd

it for ten ones, making 12 ones in the ones column. After the student has subtracted, ask another student to check using addition. Repeat this regrouping from tens to ones.

3.03.01.02 compute subtraction examples with one regrouping (exchange) having minuends to $9.99 and check

STRATEGY 1:

Place items at the front of the room with price tags. Price tags should not exceed $9.50. Distribute to each student an assortment of play money. No student should have more than $9.99. Designate a storekeeper to stay at the front of the room. Allow students to take turns purchasing an item. For each transaction have the students formulate a corresponding subtraction example. Use the amount of money the buyer has as the minuend, and the change as the difference. Explain that subtraction done with money is done in the same way as subtraction with whole numbers. Remind the students to put the dollar sign and decimal point in the correct place. Ask the students to compute the example at their seats. Ask a student to do the computation on the chalkboard so that other students can check their work. Continue using subtrahends to $9.99.

STRATEGY 2:

Display a group of sports equipment with price tags up to $9.99 on them. Show two items, e.g., a basketball and a football. Select a student to read the monetary value of each. Say, "Which item costs more? How much more?" Ask a student to answer the first question. Say, "What must we do

STRATEGY 2: cont'd

in order to find out how much more the basketball costs?" Ask a student to create an appropriate subtraction example and write it on the chalkboard. Say that the more expensive ball is the subtrahend, the cheaper ball the minuend, and the answer is the difference. Ask a student to compute the example at the chalkboard. Stress the alignment of the decimal points. Continue the procedure using other subtraction examples which compare other items having prices up to $9.99.

3.03.01.03 solve word problems related to skills learned in this module

STRATEGY 1: Write the following problem on the chalkboard. e.g.,

> Jose had 983 pennies. He put 238 in the bank. How many pennies did he have left?

Review the steps used in problem solving: 1. Read the problem; 2. Find the key words; 3. Decide on the operation; 4. Estimate the answer; 5. Solve; 6. Check your answer. Say "Which operation must we use in order to solve this problem?" Elicit from students that we must subtract. Say "What is the key word in this problem?" Ask one student to come to the chalkboard to write the examples, estimate the answer and solve the problem. Repeat this procedure using problems that relate to the students and, in which, there is one regrouping from tens to ones.

STRATEGY 2: Adapt Strategy 1 used in P.O. 3.02.02.02 for subtraction with one regrouping from tens to ones.

P.O. 3.03.01.01

NAME:_____ CLASS:_____ DATE:_____

Peter Pup is hungry. He is looking for a bone. To help him find the bone, color all the rocks that have a difference of 200 or less, red. Follow the red rocks to the bone.

4868 − 1249

4563 − 239

876 − 269

5671 − 2466

973 − 558

694 − 528

784 − 238

755 − 418

596 − 167

365 − 237

2880 − 1357

744 − 625

582 − 436

4392 − 4226

2543 − 1227

5790 − 5623

972 − 837

7296 − 3148

6281 − 6224

4896 − 1217

898 − 729

842 − 413

P.O. 3.03.01.01

NAME: _____ CLASS: _____ DATE: _____

Who will win the game of tic-tac-toe (X or O)?
Subtract to find out.

X	O
237	255
213	328
524	635
6416	407
1518	1531

960 -723 = 237 [X]	370 -115 = [ ]	891 -256 = [ ]
534 -127 = [ ]	481 -268 = [ ]	677 -349 = [ ]
9871 -3455 = [ ]	6880 -5349 = [ ]	2743 -1225 = [ ]

P.O. 3.03.01.02

NAME: _____ CLASS: _____ DATE: _____

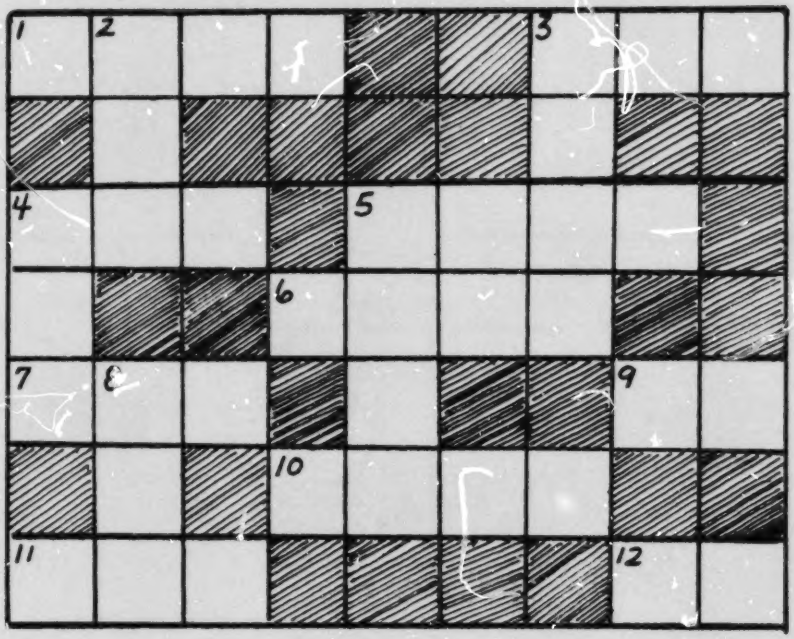
Which costs more? How much more?
Subtract to find the answer.

$ 9.90
- 5.26
$ 4.64

P.O. 3.03.01.03

NAME:_____CLASS:_____DATE:_____

Solve the problems and complete the puzzle.



ACROSS

(1) John has 8578 bottle caps. He lost 4,339. How many were left?

(3) Maria collected 628 stamps. Her book holds 952 stamps. How many more must she collect?

(4) There were 795 children in third grade last year. This year there are 528 children. How many more children were in third grade last year?

(5) The tallest building in Jose's town is 6590 feet tall. Another building

DOWN

(2) Tawana bought a doll that cost $3.09. If she had $5.45, how much money does she have left?

(3) On Thursday 3145 people attended the ball game. On Friday 6,390 people attended the ball game. How many more people attended on Friday?

(4) Kesha wants 392 pennies. She has 154 pennies. How many more pennies does she need?

(5) Madison Square Garden holds 5,491 people. If 1,464 people came to the

P.O. 3.03.01.03 cont'd

NAME:_____ CLASS:_____ DATE:_____

ACROSS

(5) is 2,248 feet tall. How much taller is the tallest building?

(6) A truck delivered 7,982 bricks on Monday and 3,917 bricks on Tuesday. How many more bricks did it deliver on Monday?

(7) A new building needs 982 panes of glass. 146 have been installed. How many more must be put in?

(9) There are 551 children in fifth grade on Tuesday 518 were present. How many were absent?

(10) The milk company had 7,973 bottles of milk. If 2,269 bottles were delivered, how many were left?

(11) The teacher ordered 483 pencils. Only 118 were delivered. How many were missing?

(12) There are 191 pages in the book Kenya is reading. She has read 109 pages. How many more pages must she read ?

DOWN

(5) circus, how many empty seats were there?

(8) Miquel's family is visiting a friend who lives 792 miles away. If they travel 436 miles the first day, how many more miles will they have to travel?

3.04.03 MULTIPLICATION OF TWOS

(2-3 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.04.03.01A multiply two by the numbers one (1) through nine (9) using vertical and horizontal formats;
e.g.,

$$\begin{array}{r} 2 \\ \times\ 1 \\ \hline 2 \end{array} \qquad \begin{array}{r} 2 \\ \times\ 2 \\ \hline 4 \end{array} \qquad \begin{array}{r} 2 \\ \times\ 3 \\ \hline 6 \end{array}$$

1 x 2 = 2
2 x 2 = 4
3 x 2 = 6

3.04.03.02A apply the commutative property of multiplication to the two times table;
e.g.,

2 x 6 = 12
6 x 2 = 12
2 x 6 = 6 x 2

3.04.03.03A solve word problems related to skills learned in this module.
e.g.,

If 6 boys each buy 2 apples, how many apples will they buy altogether?

6 x 2 = 12 apples

3.04.03

VOCABULARY

TERMS

vertical
horizontal
commutative
factor
product

Teach the students the game, "Buzz." The first student in a row starts with the number one. The next student would say the number two, but in the game, "Buzz", every time a student must say a number that is a multiple of 2, he/she says, "Buzz" instead. Therefore, the second student says, "Buzz." The third student says, "Three." The fourth student says, "Buzz" and so on. When a student makes an error (forgets to say "Buzz" for a multiple of 2), he/she is out.

Prepare flash cards for the two times table.
e.g., [1 x 2] [5 x 2] [3 x 2] [4 x 2]. Divide the class into two teams. Say, "When I show you a card, state the answer." Show a card to the first person on the team. If he/she gets the correct answer, that team gets a point. Then show the next card to the first person on the other team. If he/she gets the correct answer, that team gets a point. Continue the game using all of the cards. The team with the most points wins the game.

3.04.03

3.04.03.01 multiply two by the numbers one (1) through nine (9) using vertical and horizontal formats

STRATEGY 1: Say the multiplcation facts for twos, e.g., 1 x 2...5 x 2. Use repeated addition to elicit the facts, 6 x 2...9 x 2. e.g., 2 + 2 + 2 + 2 + 2 = 12 or 6 twos = 12 or 6 x 2 = 12. Repeat this procedure through 9 x 2. Write the facts for two on the chalkboard horizontally. Explain to the students that these facts can be written in another way, e.g., 1 x 2 = 2 or $\begin{array}{r} 2 \\ \times 1 \\ \hline 2 \end{array}$,...9 x 2 = 18 or $\begin{array}{r} 2 \\ \times 9 \\ \hline 8 \end{array}$.

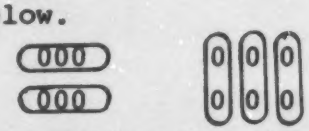
STRATEGY 2: Use a magnetic board and discs to show one (1) group of 2 equals 2. Write 1 x 2 = 2. Continue for 2 x 2, 3 x 2,...9 x 2. Ask students to come to the chalkboard after each fact is demonstrated to write the algorithm, e.g., 1 x 2 = 2,...9 x 2 = 18. Say that this can be written in another way. e.g.,

$$\begin{array}{r} 2 \\ \times 1 \\ \hline 2 \end{array} \qquad \begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array} \qquad \begin{array}{r} 9 \\ \times 2 \\ \hline 18 \end{array}$$

Ask students to come to the chalkboard one at a time to rewrite the facts vertically next to the place where they have been written horizontally.

3.04.03.02 apply the commutative property of multiplication to the two times table

STRATEGY 1: Use a magnetic board and discs. Set up the discs as shown below.



Use chalk to outline the discs as shown. Say to the students to read the groupings. Elicit from the students that the first grouping shows 3 x 2.

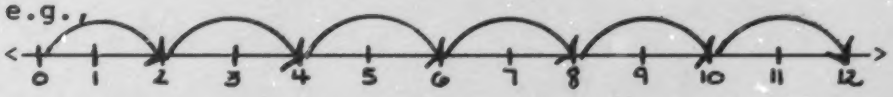
STRATEGY 1: cont'd

Write on the chalkboard 2 x 3 = ☐ , 3 x 2 = ☐ . Ask one student to count the discs in each group. Elicit from students that 2 x 3 = 6 and 3 x 2 = 6. Repeat this procedure several times. Say that this idea is called the commutative property of multiplication. Write the following on the chalkboard, e.g., 1 x 2 ... 9 x 2. Ask students to come to the chalkboard to apply the commutative property to each fact by writing its commutative pair.

STRATEGY 2:

Draw a number line on the chalkboard.

e.g.,



Use this number line to illustrate 6 x 2 (6 jumps of 2 = ☐). Ask one student to complete the example by filling in the box. Say, "How can we show 2 jumps of 6 on the number line? What number do we reach? How can we show 6 jumps of 2?" Elicit from students that 6 jumps of 2 = 12 and 2 jumps of 6 = 12. Repeat this procedure using other examples from the multiplication facts of 2. Say that this idea is called the commutative property as applied to multiplication. Ask students to come to the chalkboard to write commutative pairs.

e.g.,

6 x 2 = 2 x 6

4 x 2 = 2 x 4

3.04.03

3.04.03.03 **solve word problems related to skills learned in this module**

STRATEGY 1: Say, "When we solve problems, we:

1. Read the problem.
2. Find the key words.
3. Decide on the operation.
4. Estimate your answer.
5. Solve.
6. Compare the answer and the estimate.

Write the following word problem on the chalkboard.
e.g.,

There are 9 shoe boxes on a shelf.
There are 2 shoes in each box.
How many shoes are there altogether?

Say, "What are the key words?" Elicit from students that the key word altogether usually tells us to add. Say, "If we add 9 + 2 will that we know how many shoes there are?" Elicit from students that when a problem talks about 2 different things like pairs of shoes and boxes, we cannot add, we must multiply. Ask a student to come to the chalkboard to solve the problem (9 x 2 = 18 shoes). Repeat this procedure using other word problems which require knowledge of the two times table for a solution. Remind students to label their answers.

STRATEGY 2: Write on the chalkboard 2 x 5 = □. Ask, "Who can create a word problem that can be solves using this open sentence.?" Elicit a problem.
e.g.,

Two girls have five crayons each.
How many crayons do they have altogether?

Elicit from the students the steps involved in solving a word problem.

STRATEGY 2: cont'd

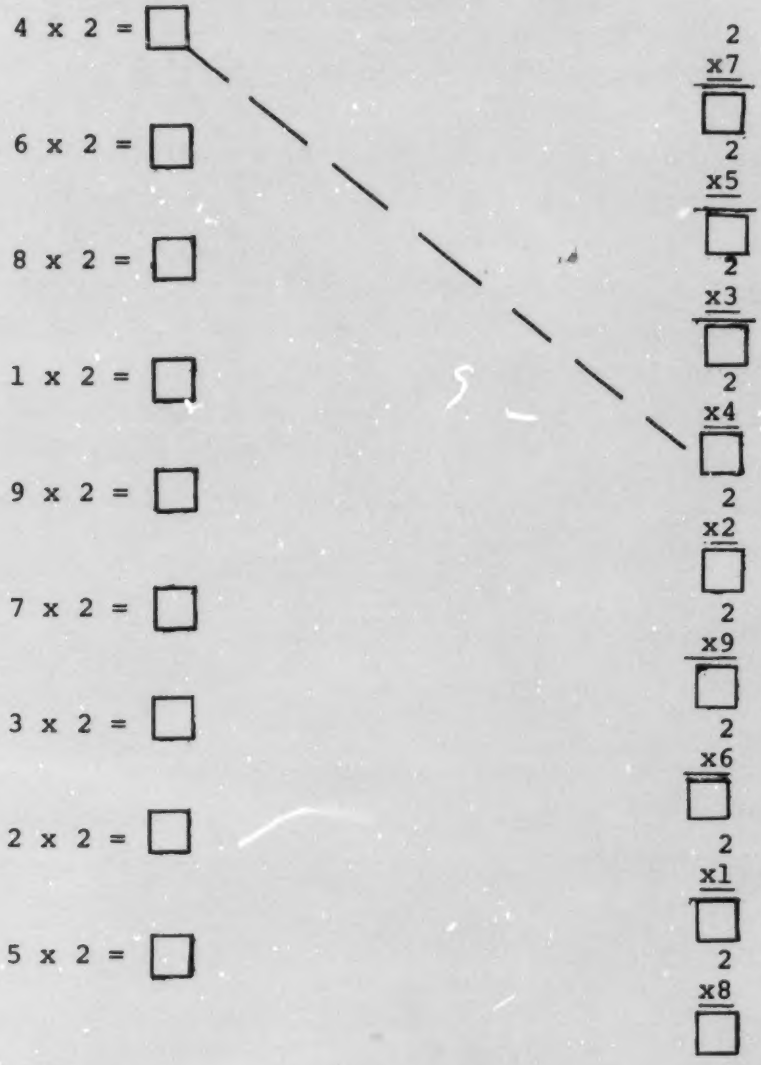
1. Read the problem.
2. Find the key words.
3. Decide on the operation.
4. Estimate your answer.
5. Solve.
6. Compare the answer and the estimate.

Distribute flashcards, half with multiplication facts involving 2, and half with word problems involving the multiplication of 2. Say, "Those of you with the open sentence on your card will write a word problem using the facts and solve. Those of you with a word problem will write the open sentence, underline the key words, estimate and solve." Write the directions on the chalkboard for clarification. Allow several students to share their work, problems, etc. with the other students.

P.O. 3.04.03.01

NAME: _____ CLASS: _____ DATE: _____

Match the number sentences and write the correct answer in each box.



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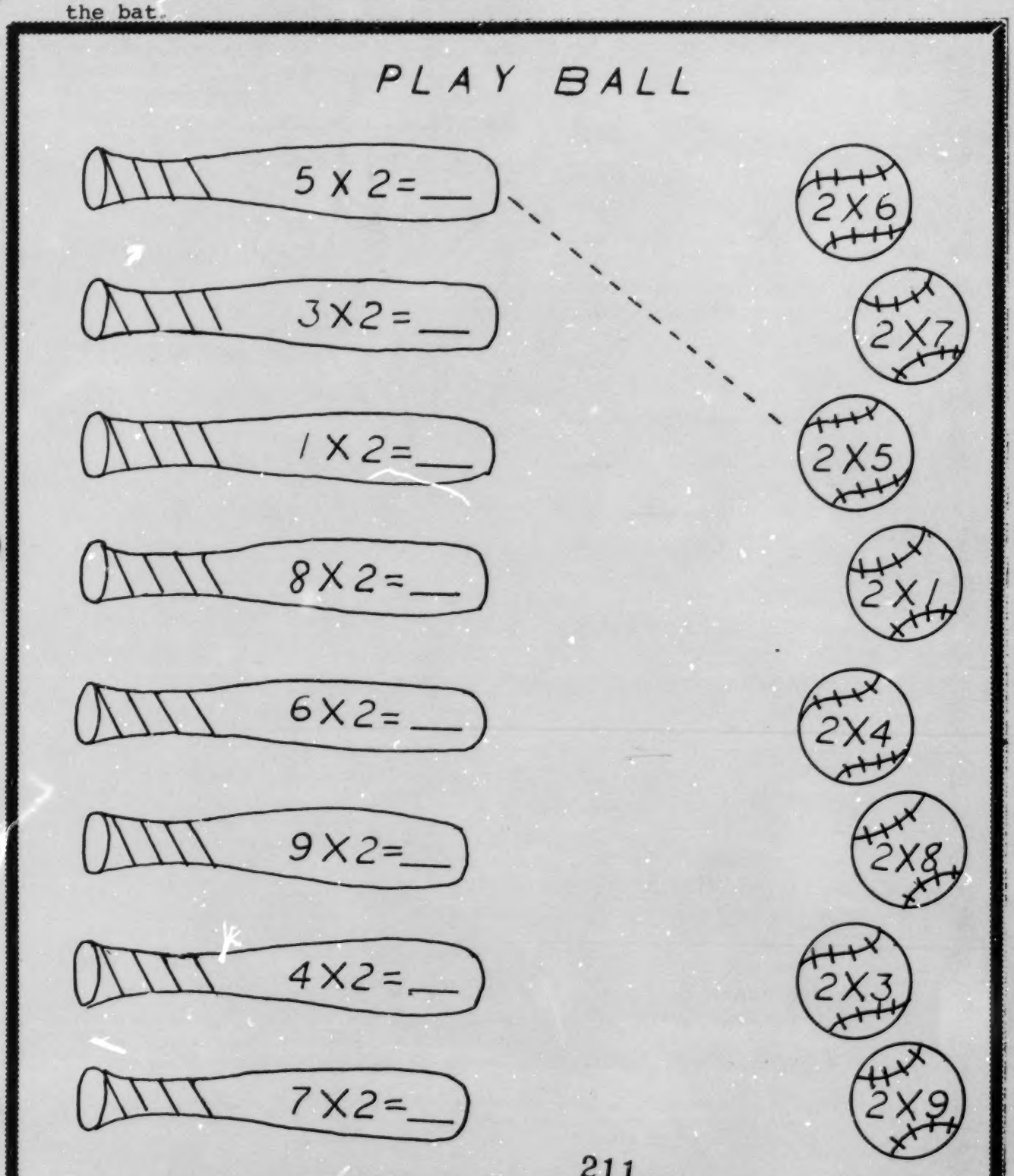
P.O. 3.04.03.02

NAME:_____ CLASS:_____ DATE:_____

Match the bat to its ball by drawing a line. Write each answer on the bat.



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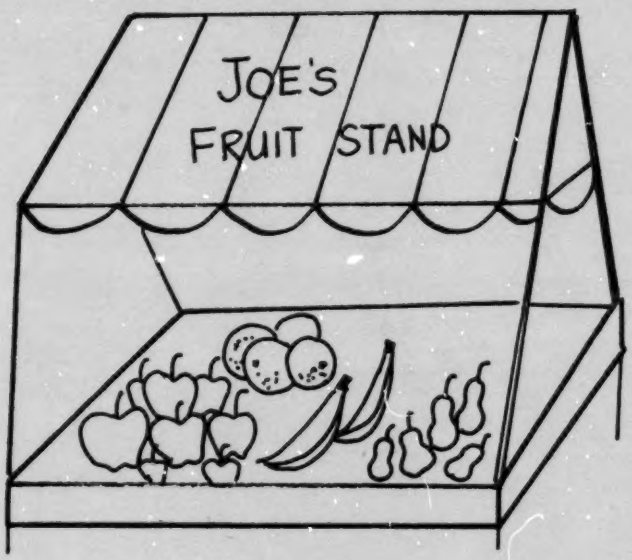
P.O. 3.04.03.03

NAME:_____ CLASS:_____ DATE:_____

Use the price list from the fruit store to solve the problems.



Price List

Apples 2¢

Bananas 4¢

Oranges 6¢

Pears 5¢

1. Rosa wants to buy 8 apples. How much will they cost? _____

2. Tamika has 10¢. Will she be able to buy 2 pears? _____.

3. Joe has 15¢. Does he have enough money to buy 2 oranges? _____

4. Johnny wants to buy 2 bananas. How much will they cost? _____.

5. If Maria buys 5 apples and 2 pears, how much money will he spend? _____.

In the space below write a word problem using the information on the fruit stand price list.

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3.04.04 MULTIPLICATION OF FIVES

(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.04.04.01A multiply five (5) by the numbers one (1) through nine (9) using vertical and horizontal formats;
e.g.,

$$\begin{array}{rrr} 5 & 5 & 5 \\ \times 1 & \times 2 & \times 3 \\ \hline 5 & 10 & 15 \end{array} \qquad \begin{array}{l} 1 \times 5 = 5 \\ 2 \times 5 = 10 \\ 3 \times 5 = 15 \end{array}$$

3.04.04.02B apply the commutative property of multiplication to the 5 times table;
e.g.,

$5 \times 6 = 30$
$6 \times 5 = 30$
$5 \times 6 = 6 \times 5$
$5 \times 9 = 9 \times \square$

3.04.04.03A solve word problems related to skills learned in this module.
e.g.,

If there are 6 pupils and each pupil is to receive 5 pencils, how many pencils do we need?

$6 \times 5 = 30$ pencils

3.04.04

VOCABULARY

TERMS

multiplication
factor
product
commutative property

GETTING STARTED

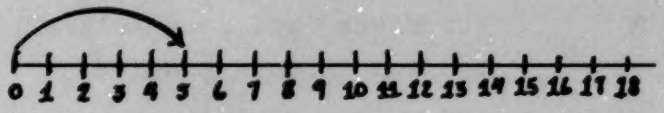
Ask the students to trace their hands and cut out what they traced. Ask a student to raise one (1) hand. Say, "How many fingers are on one (1) hand?" Repeat and record.

e.g.,

Number of Hands	Number of Fingers
1	5
2	10
3	15

Display on a transparency or on the chalkboard, a number line with numbers 0 through 50. Prepare a large cut out of a rabbit or frog. Say, "This frog's name is Cinco. Cinco means five in Spanish. Cinco can only jump 5 spaces at a time. If he starts at zero and takes 1 jump where will he land?" Record on the chalkboard.

e.g.,



The Story of Cinco

1 jump - 5
2 jumps - 10
3 jumps - 15

3.04.04

3.04.04.01 **to multiply five (5) by the numbers one (1) through (9) using vertical and horizontal formats**

STRATEGY 1: Display one large domino with 5 on it or a large index card with paper circles pasted as they would appear on a domino. Say, "How many groups of 5 do you see? (1) What number sentence tells us about 1 group of 5?" Elicit and record on chalkboard, 1 x 5 = ☐ . Say, "How many dots are in one group of 5?" (5) Repeat for all numbers 1 through 9.

After all the facts are developed and recorded on the chalkboard, ask the students to record them in their notebooks.

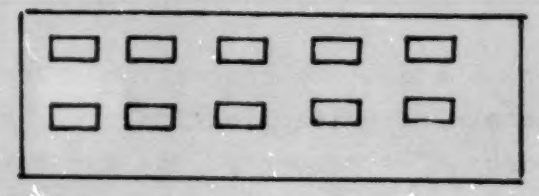
e.g.,

How do we multiply by 5?

1 x 5 =
2 x 5 =
.
.
.
9 x 5 =

STRATEGY 2: Prepare and distribute to each student or pair of students, beans, pegboards, colored cubes or bottle tops, and one (1) sheet of paper with wide lines. Paste a piece of oaktag on the chalkboard and display an array.

e.g.,



STRATEGY 2: cont'd

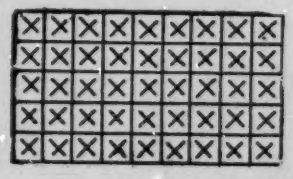
Say, "How many rows are there?" Elicit 2. Say, "How many columns?" Elicit 5. Say, "What number sentence represents this picture?" Elicit 2 x 5 = 10.

Say, "Use the lines on your paper to separate the row. Show me 5 rows and 3 columns." Ask a student to write a related number sentence, e.g., 5 x 3 = 15.

Repeat this procedure using other numbers until all facts for five are developed.

3.04.04.02 **apply the commutative property of multiplication to the 5 times table**

STRATEGY 1: Display a picture of an array.
e.g.,



Say, "What multiplication number sentence is shown here?" Elicit 5 x 9. Turn the array to show 9 x 5 and elicit this sentence. Say, "The order of the factors in a multiplication problem does not change the answer." Write several multiplication sentences on the chalkboard and ask a student to write the commutative pair, e.g., 3 x 1 = 1 x 3.

STRATEGY 2: Play the game Concentration. Prepare index cards containing multiplication facts which demonstrate the commutative property. Use one card for each fact.

STRATEGY 2: cont'd

e.g.,

6 x 5 = 30	5 x 6 = 30

Include facts from the 5 times table. Place the cards face down on the table. Each student who matches the cards showing the commutative application of each number fact gains a point.

3.04.04.03 solve word problems related to skills learned in this module

STRATEGY 1: Write the following on the chalkboard.

e.g.,

1. How many ears on 5 cats? ____ ears
2. 6 cups are on the table. Each cup has 4 nuts. How many nuts in all? ____ nuts
3. There are 5 cars. How many wheels in all? ____ wheels

Ask several students to write the number sentence for each problem and solve.

Repeat this procedure using other problems.

STRATEGY 2: State the rules for problem solving.

1. Read the problem.
2. Choose the appropriate operation.
3. Write a number sentence.
4. Estimate the answer.
5. Solve the number sentence.

Write a problem on the chalkboard.

e.g., Tasha has 3 cans. Each can has 4 cookies. How many cookies in all?

Ask five (5) students to go through the five problem solving steps.

Repeat this procedure using other word problems.

P.O. 3.04.04.01

NAME: _____ CLASS: _____ DATE: _____

Find each product.

2 x 5 = ☐

7 x 5 = ☐

1 x 5 = ☐

9 x 5 = ☐

5 x 5 = ☐

3 x 5 = ☐

10 x 5 = ☐

8 x 5 = ☐

4 x 5 = ☐

6 x 5 = ☐

5 x3 = ☐	5 x5 = ☐	5 x6 = ☐	5 x1 = ☐	5 x9 = ☐
5 x8 = ☐	5 x7 = ☐	5 x4 = ☐	5 x2 = ☐	5 x10 = ☐

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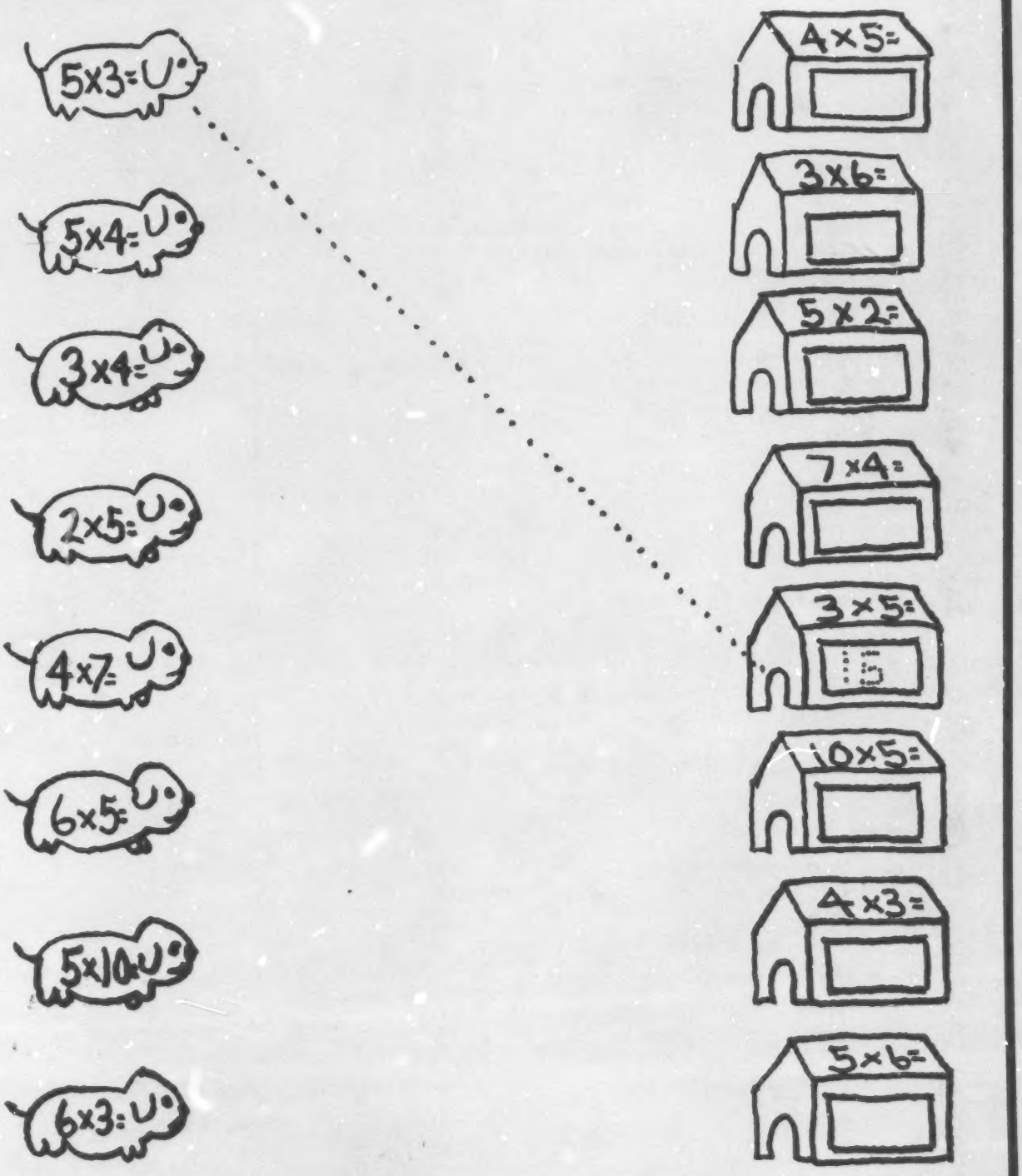
P.O. 3.04.04.02

NAME:_____ CLASS:_____ DATE:_____

Draw a line from each dog to its house.
Then write the answer in the window.



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P.O. 3.04.04.03

NAME:_____ CLASS:_____ DATE:_____

Solve each word problem. Label your answers.

	WORK SPACE
1. There are 5 rows of seats in the classroom. Nine students are seated in each row. How many students are there altogether?	
2. There are 5 buses at the bus stop. Ten people are on each bus. How many people are there in all?	
3. There are 5 boats at the dock. Four people are on each boat. How many people are there in all?	
4. There are 5 lines of people at the bank. Seven people are in each line. How many people are waiting in all?	
5. There are 5 lunch tables in the school. Four children are at each table. How many children are eating lunch?	
6. There are 5 wagons on the farm. Each wagon can carry 5 people. How many people can ride in all the wagons?	
7. There are 5 teams at the swim met. Nine people are on each team. How many people are swimming?	

3.05.02 DIVISION OF WHOLE NUMBERS (FOR TWOS THROUGH 18, FOR FIVES THROUGH 45)

(1 lesson)

PERFORMANCE OBJECTIVES

The student will be able to...

3.05.02.01A divide by 2, having dividends to 18, without a remainder;
e.g.,

$18 \div 2 = 9$ $\quad 2\overline{)18}$ $\quad \frac{9}{2)18}$ $\quad \frac{18}{2} = 9$

3.05.02.02A divide by 5, having dividends to 45, without a remainder;
e.g.,

$45 \div 5 = 9$ $\quad 5\overline{)45}$ $\quad \frac{9}{5)45}$ $\quad \frac{45}{5} = 9$

*3.05.02.03A recite the division facts for twos and fives.
e.g.,

$2 \div 2 = 1$	$5 \div 5 = 1$
$4 \div 2 = 2$	$10 \div 5 = 2$
$18 \div 2 = 9$	$45 \div 5 = 9$

3.05.02

VOCABULARY

TERMS	**SYMBOLS**
divide	÷, $\overline{)}$
dividend	
divisor	
quotient	

GETTING STARTED

Write the following on the chalkboard.
e.g.,

1	2	3	4	5
6	7	8	9	10

Ask a student to come to the chalkboard and count by twos, circling each number as they go.
e.g.,

1	(2)	3	(4)	5
(6)	7	(8)	9	(10)

Ask another student to say the circled numbers, e.g., 2,4,6,8,10.
Repeat for fives through 25.

Prepare 10 beads, bottle caps, or marbles. Ask five (5) children to come to the front of the room. Say, "I have 10 items here. I want to share these things among these five (5) people. How can I do this?" Elicit that we give each student 1 item at a time and continue until none are left. Distribute one (1) item at a time to each student until none are left. Say, "How many items do you have? (2) Does everyone have two (2) items? How can we write this as a number sentence?" Elicit 10 ÷ 5 = 2.

Repeat this procedure using different numbers of items and students including division facts for 1 two through 5 twos and division facts for 1 five through 5 fives.

3.05.02.01 divide by 2, having dividends to 18, without a remainder

STRATEGY 1: Distribute to the students varied amounts of buttons, bottle caps or other manipulative material in even amounts, not to exceed 18. Ask the students to count their buttons and guess how many groups of twos they can make. Say, "How do you know?" Elicit that there are four 2's in eight.

Say and write on the chalkboard, "How many 2's are in 6?" Ask the students to divide six buttons into groups of two. Demonstrate on a flannel board or an overhead projector.

Introduce the symbols for division by saying, "How can we write this in a number sentence?"
e.g.,

$\frac{6}{2} = 3$ $\quad 6 \div 2 = 3$ $\quad 2\overline{)6}^{3}$

Repeat this procedure using all of the number facts for 2 through 18.

STRATEGY 2: Say, "There are two (2) shoes for each child. If there are eight (8) shoes, how many children are there? How many twos are in eight (8)?"

Construct a table.
e.g.,

children	shoes
1	2
2	4
3	6
:	:
9	18

STRATEGY 2: cont'd

Elicit that there are four (4) children. Say, "How can we write this in a number sentence?"
e.g.,

$2\overline{)8}^{\,4}$ $\qquad 8 \div 2 = ___ \qquad \frac{8}{2} =$

Repeat using other numbers of shoes.

3.05.02.02 divide by 5, having dividends to 45, without a remainder

STRATEGY 1: Draw or construct a tree with five (5) branches. Collect real leaves or make them out of construction paper not to exceed 45. Say that the leaves can be shared or divided evenly among the five branches. Ask a student to do the actual sharing, while another student records the number sentence on the chalkboard.
e.g.,

$20 \div 5 = 4 \qquad 5\overline{)20}^{\,4} \qquad \frac{20}{5} = 4$

STRATEGY 2: Adapt Strategy 1 used in P. O. 3.05.02.01 for division by 5.

3.05.02.03 recite the division facts for twos and fives

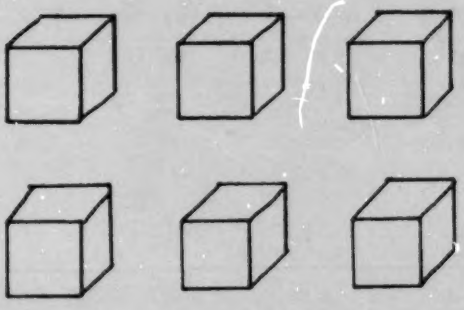
STRATEGY 1: Divide the students into two teams. Using division flash cards for twos and fives, ask the students to recite the facts and give the answers. Each team gets two points for a correct answer and they lose a point for an incorrect answer. Continue until one team gets 15 points.

STRATEGY 2: Prepare division flashcards for twos. e.g., 4 ÷ 2 = ☐ , 8 ÷ 2 = ☐ , 16 ÷ 2 = ☐ . Going around the room, show a flashcard to each student and ask the student to say the answer. Repeat this procedure several times using the flashhcards. Then ask the students to recite the facts without the cards. Repeat the entire procedure for the facts for five.

P.O. 3.05.02.01

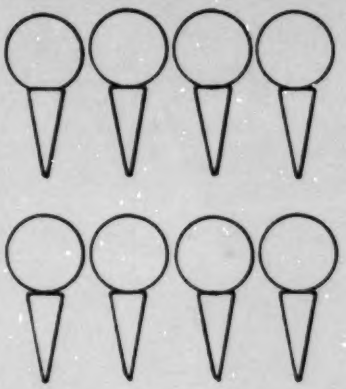
NAME: _____ CLASS: _____ DATE: _____

Divide into groups of 2



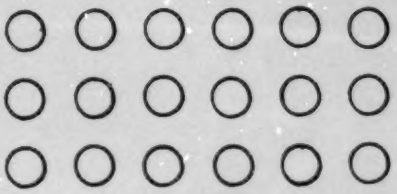
6 BLOCKS

HOW MANY GROUPS OF 2? ☐



8 CONES

HOW MANY GROUPS OF 2? ☐



18 CIRCLES

HOW MANY GROUPS OF 2? ☐

$4 \div 2 =$ ☐

$8 \div 2 =$ ☐

$12 \div 2 =$ ☐

$2\overline{)6}$ ☐

$2\overline{)10}$ ☐

$2\overline{)2}$ ☐

$\frac{14}{2} =$ ☐

$\frac{16}{2} =$ ☐

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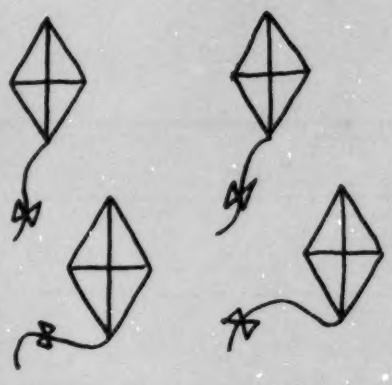
P.O. 3.05.02.01

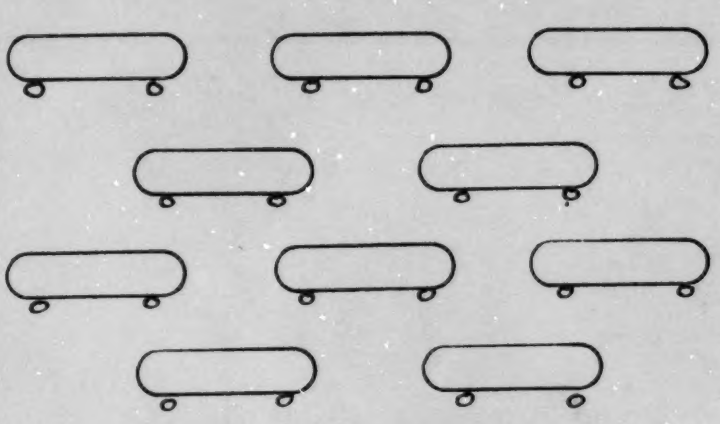
NAME: _____ CLASS: _____ DATE: _____

Divide into groups of 2.



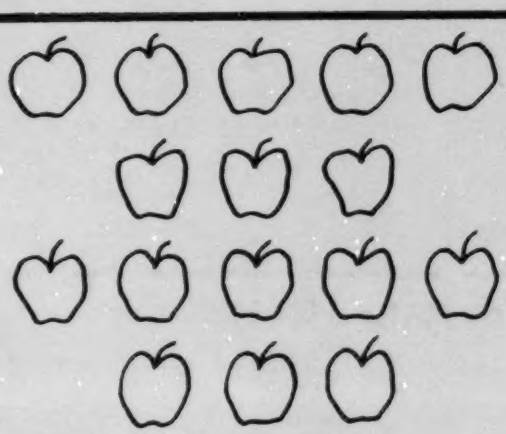
4 KITES

HOW MANY GROUPS OF 2? ☐



10 SKATEBOARDS

HOW MANY GROUPS OF 2? ☐



16 APPLES

HOW MANY GROUPS OF 2? ☐

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NAME: _____ CLASS: _____ DATE: _____

Circle groups of fives.

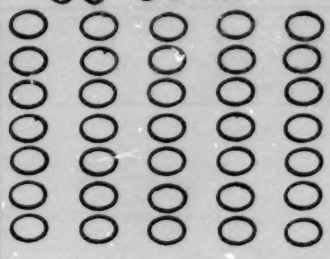
10 STARS

HOW MANY GROUPS OF 5? ☐

$5\overline{)10}$ ☐

$2 \times 5 = \square$

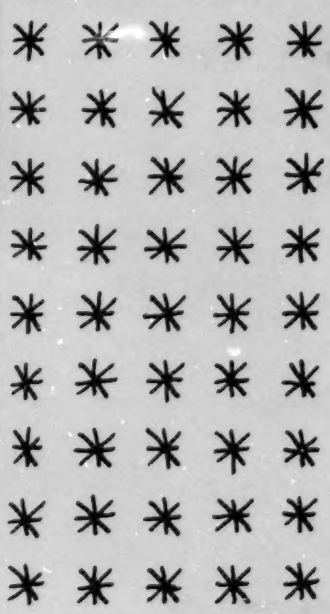
35 OVALS



HOW MANY GROUPS OF 5? ☐

$5\overline{)35}$ ☐

$7 \times 5 = \square$



45 ✱'S HOW MANY GROUPS OF 5? ☐

$5\overline{)45}$ ☐

$9 \times 5 = \square$

15 DIAMONDS HOW MANY GROUPS OF 5? ☐

$5\overline{)15}$ ☐

$3 \times 5 = \square$

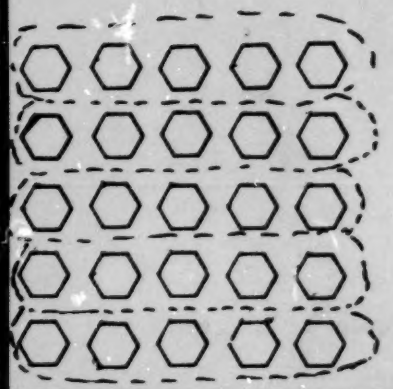
P.O. 3.05.02.02

NAME: _____ CLASS: _____ DATE: _____

Circle groups of fives.

25 Polygons

How many groups of 5 ? 5

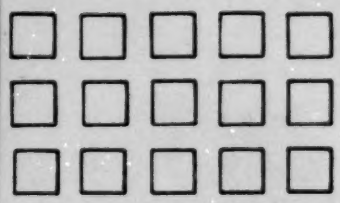


$5\overline{)25}$ 5

$5 \times 5 = 25$

15 Squates

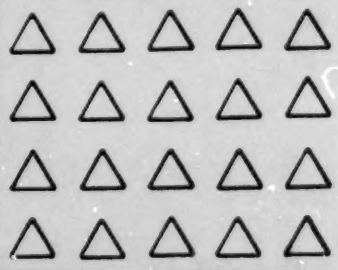
How many groups of 5? ☐



$3\overline{)15}$ ☐ $3 \times 5 = ☐$

20 Triangles

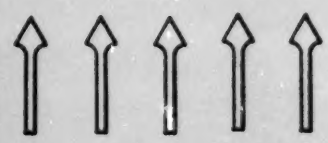
How many groups of 5? ☐



$4\overline{)20}$ ☐ $4 \times 5 = ☐$

5 Arrows

How many groups of 5? ☐



$1\overline{)5}$ ☐ $1 \times 5 = ☐$

3.13.01 GUESS AND CHECK

(2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.13.01.01A make and verify a guess;
e.g.,

How many steps will you take to cross the room?

3.13.01.02A check his/her guess against problem conditions.
e.g.,

I am holding 3 coins in my hand.
No two coins are alike.
The total is 40¢.
What are the coins?

3.13.01

VOCABULARY

TERMS

guess
verify
check

GETTING STARTED

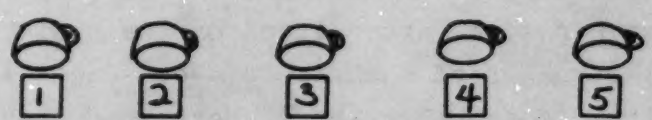
Write the following description of a person on the chalkboard.

"I was once an actor. My initials are R. R. Now I work and live in the White House. Who am I?"

Encourage the students to examine the clues and guess who is the person being described. Ask the students to write on a piece of paper three (3) things that describe themselves. Ask the students not to write their names on the paper. Collect the papers and put them in a bag. Say, "I will choose a student to pick a paper from the bag and read the description to the class. Listen carefully and try to guess who is the person described." Repeat this activity by asking other students to read the descriptions of other students in the class. This activity will give the stduents practice in making guesses by examining given information.

Place five cups, open end down, at the front of the room for all students to see. Designate the position of each cup with a number (see model). Present a small object (chip, block, piece of chalk) for the students to examine. Place the object under one of the cups. Mix the cups around. Ask the students to observe the movements carefully.

e.g.



Ask, "Can you guess where the object is now?" Ask a student to verify his/her guess. If the student is correct he/she can now hide the object and mix up the cups. Continue this activity so that the students can practice making guesses.

3.13.01

3.13.01.01 **make and verify a guess**

STRATEGY 1: Prepare and distribute to each student a supply of beads or chips or any small objects and a cup. On the cup draw two lines designating different levels.
e.g.,

Ask the students to look at the objects. Say, "How many of these objects will it take to fill the cup to the first line?" Record the student's guesses on the chalkboard. Instruct the students to fill the cups until they reach the first line. Ask a student to count the number of objects in the cup. Write the actual number on the chalkboard. Check the answer against the students' guesses to see which guess came closest. Repeat this procedure asking students to guess the number of objects needed to reach the second line, and then to fill the whole cup.

STRATEGY 2: Write the numbers 2, 6 and 8 on the chalkboard. Ask the students to guess how many 3-digit numbers can be made using these numbers. Record students' guesses on the chalkboard. Ask the students to write the different combinations on a piece of paper. Ask a student to write one combination he/she found on the chalkboard. Repeat until all combinations are written on the chalkboard. Count the number of numbers formed. Check the total with the guesses that the students had previously made. Repeat this procedure using other groups of numbers. Vary the number of digits for each

STRATEGY 2: cont'd

activity. Say, "How can we make more combinations of numbers?" Elicit that the more numbers with which we start, the more combinations will result.

3.13.01.02 check his/her guess against problem conditions

STRATEGY 1: Reinforce the problem solving approach.
e.g.,

1. Reading and understanding the problem. Ask questions by students to insure the comprehension of the problem. Encourage students to determine what is being asked.
2. Selecting what to do. Encourage students to explore the different methods of problem solving.
3. Solving the problem. Ask students to work out the problem using the method they have chosen.
4. Discussion and review of the problem.

Discuss student answers and methods used to arrive at the answers. Ask questions pertaining to the problem, e.g., "Did you answer the question?"
Say, "I am thinking of a number between 0 and 20. It is a 2-digit, odd number. The sum of the digits is 6. What is the number I am thinking of?" Ask the students to study the problem and make a guess at the solution, e.g., the students propose that 15 is the answer. Instruct the students to check the possible answer with the conditions of the problem.
e.g.,

Condition 1 - a number between 0 and 20. 15 is within that range.
Condition 2 - a 2-digit, odd number. 15 is both 2-digit and odd.
Condition 3 - the sum of the digits is 6. 1+5=6.

STRATEGY 1: cont'd

Say that since all of the conditions of the problem have been met, the number 15 is the correct solution. Repeat this procedure using other problems where students can check their guesses against the conditions of the problem.

STRATEGY 2:

Write the following problem on the chalkboard.
e.g.,

> John wants to buy a can of juice from the juice machine. The juice costs 40¢. The machine will release the juice only if 3 different coins totaling 40¢ are inserted. What three coins must John have in order to buy the juice?

Make copies of the problem on a rexograph enabling each student to receive a copy. Ask the students to study and analyze the problem. Write students' guesses of the solution on the chalkboard. Ask students to check their answers with the conditions of the problem.
e.g.,

Condition 1 - Are the three coins different from each other?

Condition 2 - Do the three coins total 40¢?

The students who have answers which satisfy the conditions can say their solutions to the class. Ask those students how they found their answers. Repeat this procedure using other examples of problems where students can check their guesses against the conditions of the problem.

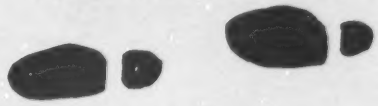
P.O. 3.13.01.01.

NAME:_____ CLASS:_____ DATE:_____

Can you Guess?
Read each question. Guess what the answer might be. Check your answer by doing what the question asks.

How many hands it takes to go across the desk.

How many steps you will take to cross the room?



How many beads will you need to fill the cup?

How many pieces of chalk will fit across the ledge of chalkboard.

How many times you can count to ten in a minute? (Work with a partner)

1 2 3 4 5 6 7 8 9 10

How many books can fit in your desk?

P.O. 3.13.01.02

NAME:_____ CLASS:_____ DATE:_____

Find the missing numbers.
Solve and check each problem.

The number that is missing comes after 20 but before 35. The number is even. If you add its digits together the sum is ten. Can you find the missing number?

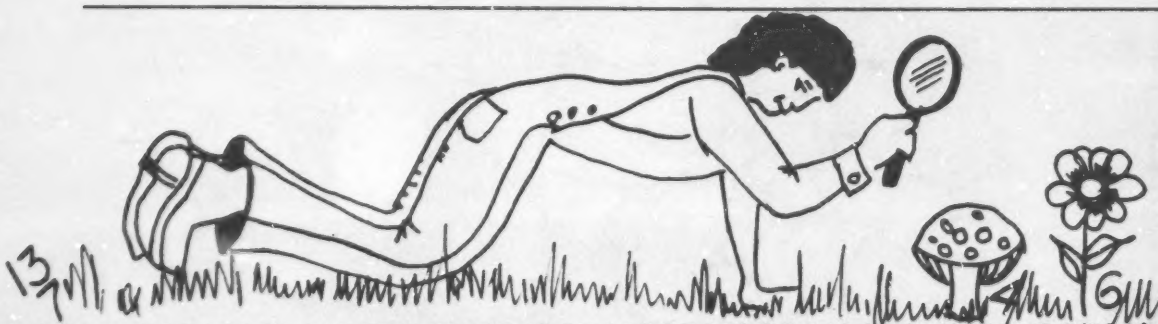
_____

A number is missing. The number is between 10 and 20. It is an odd number. When you subtract the first digit from the second digit the difference is four. Can you find the missing number?

_____

A number is missing. The number is larger than 40 but smaller than 50. It is an even number. When you subtract the first digit from the second digit the difference is 2. Can you find the missing number?

_____



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3.09.01 POINTS AND LINES

(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

3.09.01.01B recognize and name a point as a location represented by a dot;
e.g.,

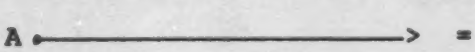
point

3.09.01.02B define, identify and name a line as a straight path that goes in both directions;
e.g.,

3.09.01.03B identify and name a line segment as a straight path between two end points;
e.g.,

$= \overline{AB}$

3.09.01.04B identify and name a ray as a line that has one end point and goes on in the other direction.
e.g.,



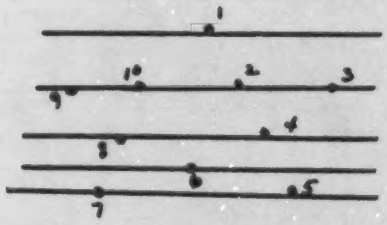
$= \overrightarrow{A}$

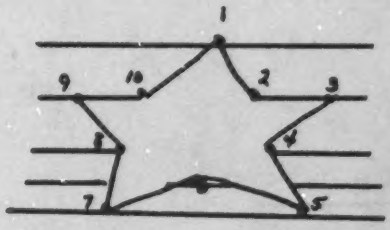
3.09.01

VOCABULARY	SYMBOLS
line	<———>
point	.A
line segment	A———B
ray	A———>

GETTING STARTED

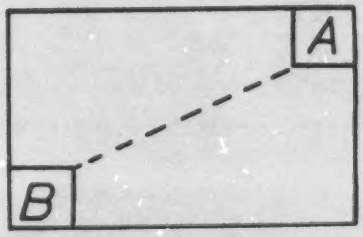
Draw a group of dots on the chalkboard. Number each dot drawn.
e.g.,





Ask the students if they can identify what the dots represent. Explain to the students that in order to find out what the dots represent, the dots must be connected in numerical order. Ask a student to connect the dots beginning with the dot labeled with the number one. Elicit from the students the figure drawn by connecting the dots. Ask, "What helped you to determine what the dots represented?" Assist students in observing that the straight lines drawn to connect the dots formed the outline of the figure. Repeat this procedure using other examples of dot representations.

Make two cards, with a capital letter written on each. Place one card at the front door of the classroom, and the other, diagonally across at the other end of the room.
e.g.,



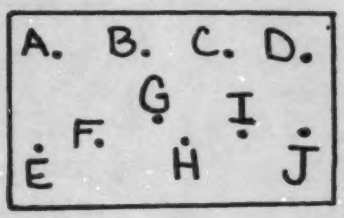
GETTING STARTED cont'd

Discuss with the students the different paths one could take to get from card A to card B. Ask several students to demonstrate the various paths. Ask the students which would be the shortest route to take. Elicit that the shortest path would be to walk in a straight line diagonally across the room. Repeat this procedure by placing the cards in other parts of the classroom. Ask the students to find the shortest path from Card A to Card B.

3.09.01

3.09.01.01 **recognize and name a point as a location represented by a dot**

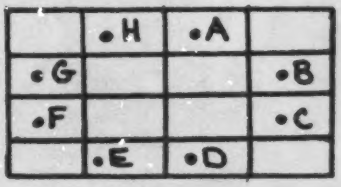
STRATEGY 1: Ask students to draw a diagram of the block on which they live. Instruct students to represent each house or building with a dot. Students label each dot with a capital letter.
e.g.,



Say, "Each dot is called a point. A point names a location such as each house on your block." Write the definition of a point on the chalkboard. Instruct the students to copy the definition into their notebooks.

Repeat this procedure using points to represent other locations, e.g., desks in classroom, cafeteria tables.

STRATEGY 2: Distribute to each student a sheet of graph paper. Ask students to put dots in the boxes to create a shape.
e.g.,



Explain to the students that each dot is called a point and each point names a location. Ask the students to name each point with a capital letter.

STRATEGY 2: cont'd

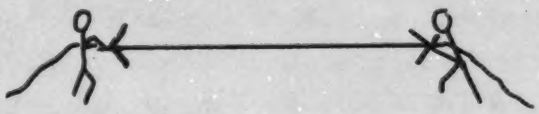
Repeat this procedure by having the students make other shapes from points. Instruct students to name each point drawn.

3.09.01.02 **define, identify and name a line as a straight path that goes in both directions**

STRATEGY 1:

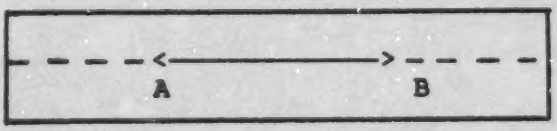
Display a long rope at the front of the room. Ask two students to hold the rope. Instruct the students to hold the rope, having about five feet between them, the remaining rope hanging down by the side of each student.

e.g.,



Cut out 2 arrows made of cardboard. Tape or pin an arrow on each of the two (2) students. Explain to the students that the two students are demonstrating what a line is. Ask, "Does the line end at the point where the students are holding it?" Assist students in observing that the line continues on past the point where the students are holding it. Say, "The students are holding only a part of the line." Explain to the students that the arrows represent the line going on in both directions. Draw the symbol for a line at the chalkboard. Explain to the students how a line is named. Label each arrowhead at the chalkboard with a capital letter.

e.g.,

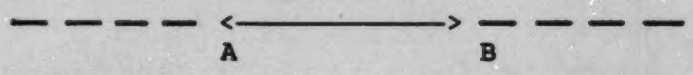


STRATEGY 1: cont'd

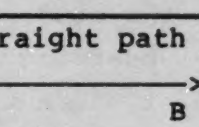
Write the definition of a line at the chalkboard, e.g., a line is a straight path that goes in both directions. Instruct the students to copy the definition and the symbol of a line into their notebooks.

STRATEGY 2:

Draw on a transparency to be used on an overhead projector the symbol of a line . Represent the extensions on both sides with dotted lines.
e.g.,



Explain to the students that a line goes on and on in both directions. Say, "We use this symbol to represent a line." Explain to the students that every line must have a name. Say, "We name a line using letters. Each name consists of 2 capital letters. We can name this line AB." Demonstrate to students that the letters A and B should be placed by each arrow. Write the definition and symbol for a line at the chalkboard.
e.g.,

A line is a straight path that goes on in both directions. 

Instruct the students to copy the definition and symbol into their notebooks. Discuss with students different examples of things that resemble a straight path that goes on in both directions, e.g., telephone lines, lines on a highway.

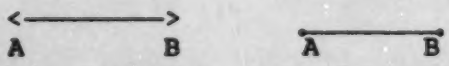
3.09.01

3.09.01.03 identify and name a line segment as a straight path between two end points

STRATEGY 1: Cut 2 strands of wool at different lengths. Ask two students to come to the front of the room. Pin a card with the letter A on one student. Pin card with the letter B on the other student. Instruct the students to hold the two pieces of wool at different tensions. Say, "Which piece is the wavier? Which piece is straighter?" Elicit responses. Say, "Which of the 2 pieces of wool do you think is the shortest?" Record responses on the chalkboard. Ask a student to measure each strand of wool. Encourage the students to conclude that the straight piece of wool is shorter. Draw the symbol for the line segment $\overline{AB}$ on the chalkboard. Say, "This symbol represents the two students holding the straight piece of wool." Explain to the students that a path between two end points is called a line segment. Say, "Student A and Student B represent the end points and the wool they are holding is the straight path." Explain to the students that the symbol is used to represent the actual line segment. Write the definition of a line segment on the chalkboard. Direct the students to copy the definition into their notebooks. Repeat this procedure using other examples of line segments. Ask the students to use other letters of the alphabet to name each segment.

STRATEGY 2: Write examples of line AB and line segment AB at the chalkboard.

e.g.,



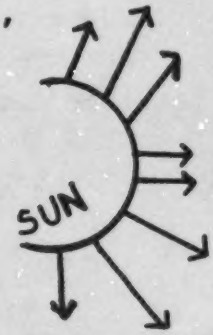
STRATEGY 2: cont'd

Elicit differences between the two. Explain to the students that a line segment is a straight path between two end points. Say, "A line segment does not go on. A line segment stops at its end points." Show students at the chalkboard the end points to line segment AB. Say, "Each end point is given a capital letter. The name of the line segment is the two capital letters." Elicit from students that this line segment is called AB. Write the definition of a line segment on the chalkboard. Direct the students to copy it into their notebooks. Distribute rulers to the students, and instruct them to draw a line segment measuring two inches, naming the line segment CD. Ask a student to draw the line segment on the chalkboard. Repeat this procedure by having the students construct and name other examples of line segments.

3.09.01.04 **identify and name a ray as a line that has one end point and goes on in the other direction**

STRATEGY 1: Draw a diagram of the sun and its rays on the chalkboard.

e.g.,



Be sure the end point touches the sun; show by an arrow the continuing end of the ray. Point to the end point that touches the sun. Say, "A ray has one end point. It extends in the other direction." Point to the extended arrow. Write the definition on the chalkboard. Ask the students to copy it

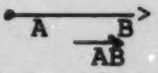
STRATEGY 1: cont'd

into their notebooks. Under the definition write the symbol for a ray AB. Explain, "It is named with capital letters. Be sure that you put the letters in the right order." A ——————> B shows that A is the end point and B is the extended side; it is written as $\overrightarrow{AB}$.

STRATEGY 2:

Make flash cards with lines, line segments and rays.

Write the definition for a ray on the chalkboard. "A ray has one end point and goes on in the other direction." Draw a ray under the definition. e.g.,



$\overrightarrow{AB}$

Write the symbol under the diagram. Ask the students, "What is the difference between a ray and a line? A ray and a line segment?" Say or elicit the following points:

1. A ray has 1 end point.
2. A line has no end points.
3. A line segment has 2 end points and no ends that extend.
4. A ray is a line that has 1 end point and goes on in the other direction.

Record the above points on the chalkboard as the students record them in their notebooks. Display 1 flashcard. Ask a student to identify it as a ray, line segment or line, and name it, e.g., ray AB. e.g.,

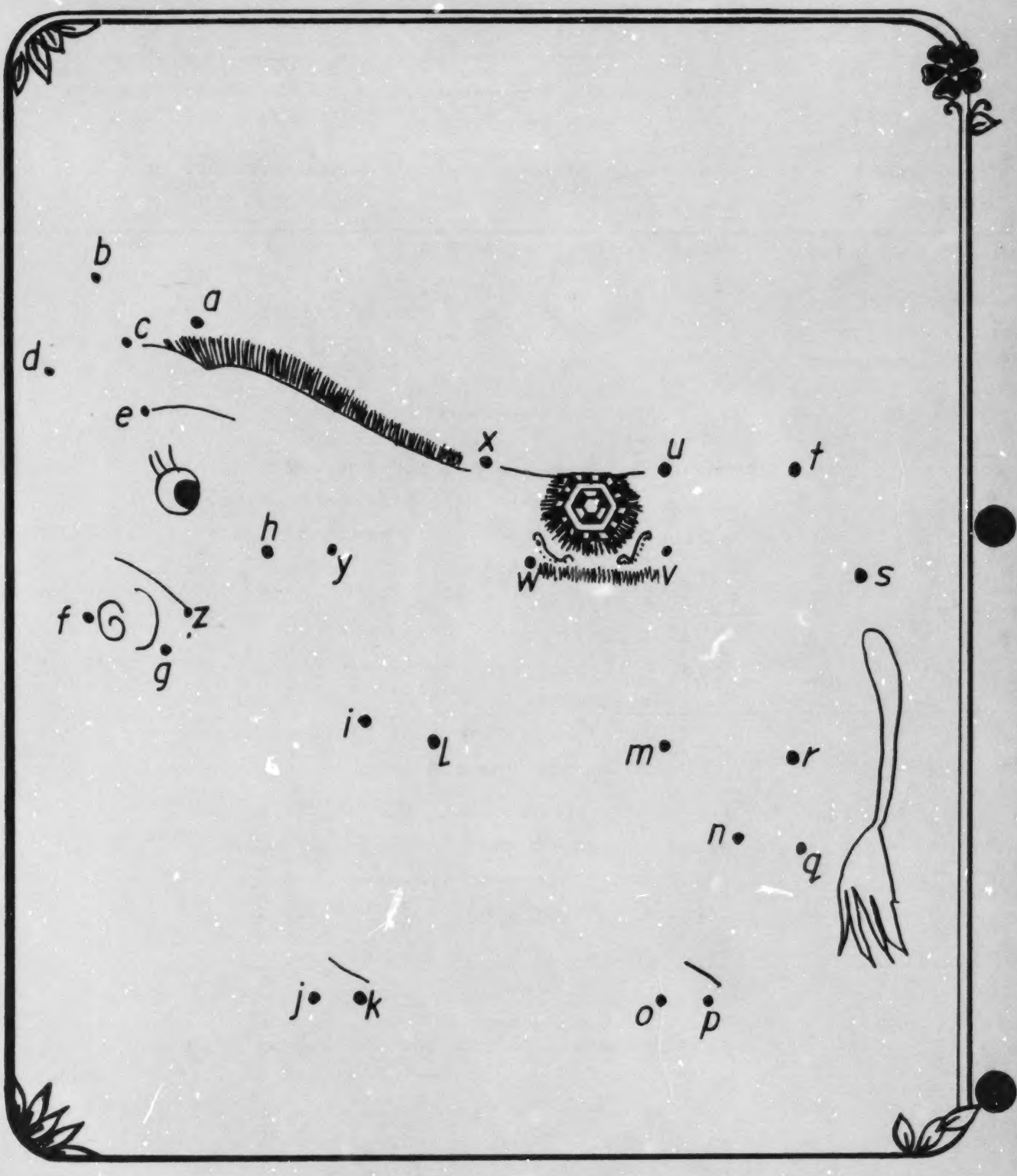
$\overrightarrow{AB}$	ray

Continue until all of the cards have been used.

P.O. 3.09.01.01

NAME: _____ CLASS: _____ DATE: _____

Connect the dots and finish the picture.

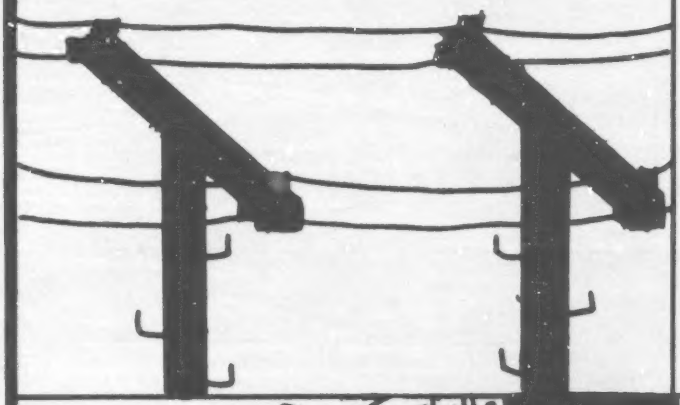


P.O. 03.09.01.02

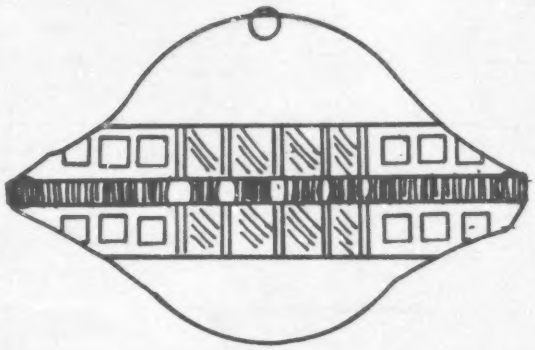
NAME:_____ CLASS:_____ DATE:_____

Put a check in each box that has a picture which suggests the idea of a line.

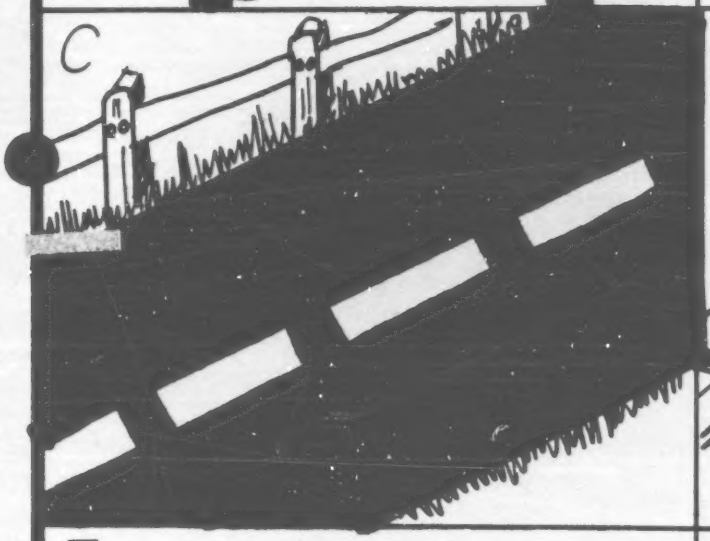
A



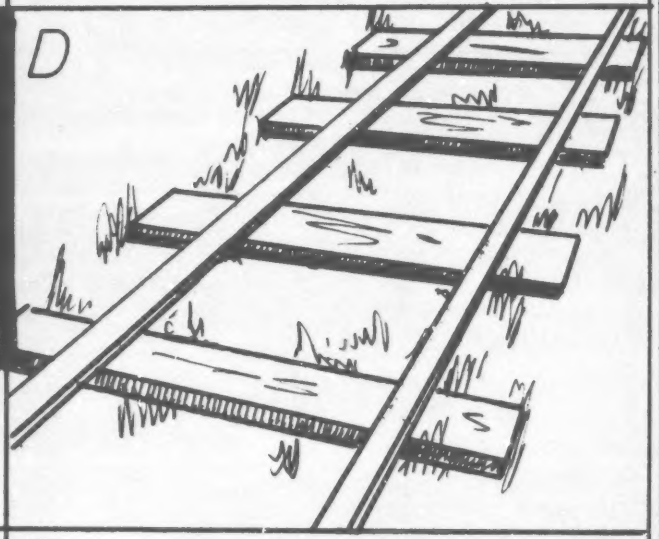
B



C



D



E

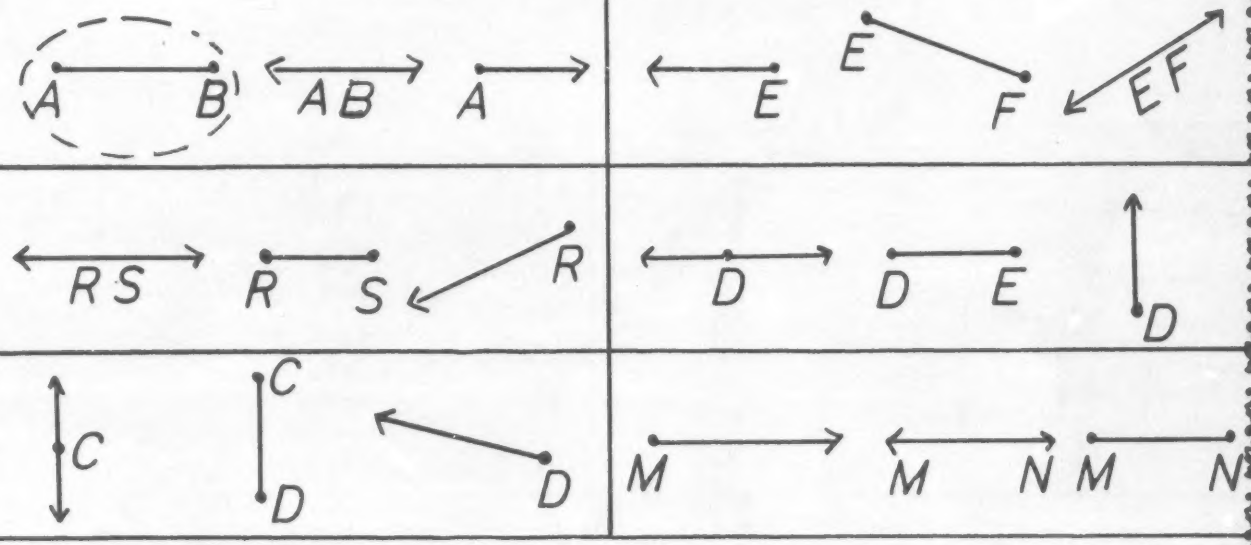
F

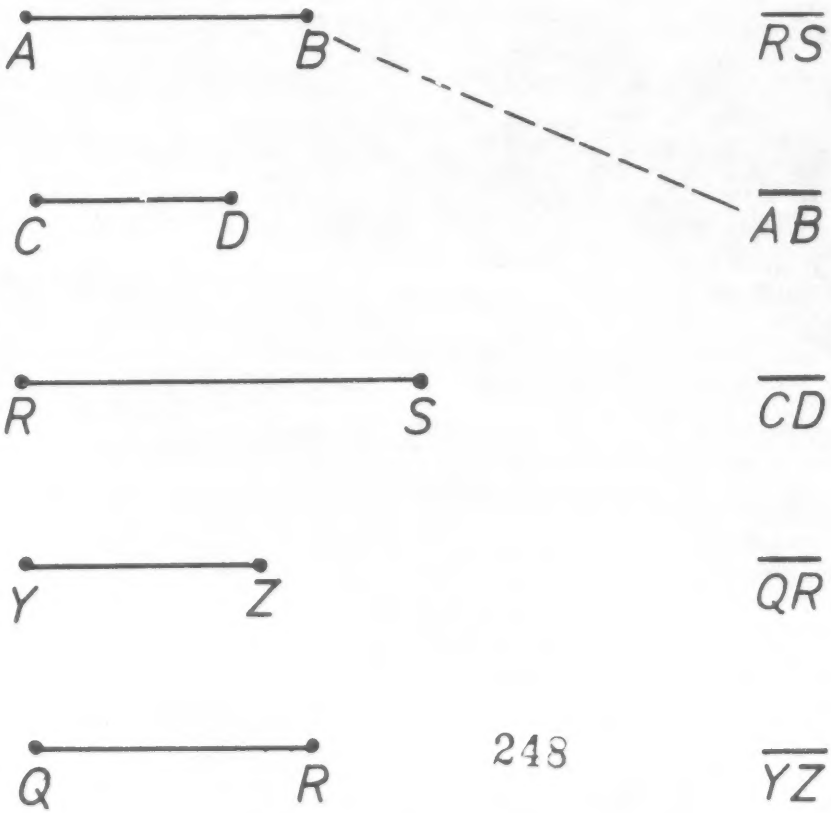
Draw a picture that suggests a line.

P.O. 3.09.01.03

NAME: _____ CLASS: _____ DATE: _____

Top - Circle the line segment.
Bottom - Match the line segment with correct symbol.





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P.O. 3.09.01.04

NAME: _____ CLASS: _____ DATE: _____

Identify and name each drawing.

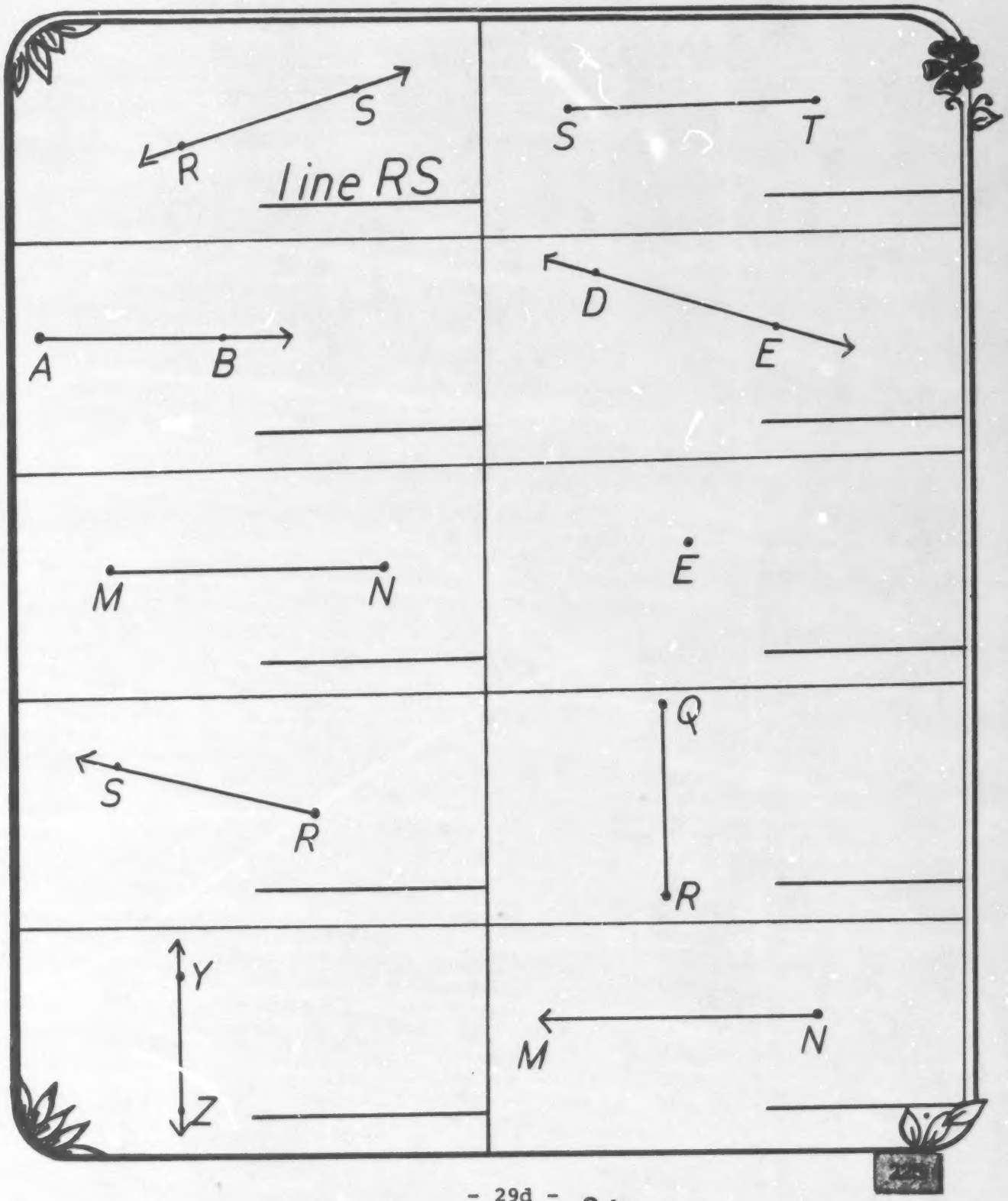

TABLE OF SYMBOLS

DEFINITIONS	SYMBOL	DEFINITIONS	SYMBOL
plus; add; positive	+	line	$\overleftrightarrow{AB}$
minus; subtract; negative	−	ray	$\overrightarrow{AB}$
plus or minus	+ or −	perpendicular lines	$\perp$
times; multiply	· or X	parallel lines	$\parallel$
divide	÷	degree	°
divide	)	equals	=
square root	$\sqrt{\ }$	is not equal to	≠
cube root	$\sqrt[3]{\ }$	is less than	<
angle	$\measuredangle$	is greater than	>
between two numerals or letters at the end of a series or sequence; and so on	...	encloses a set when numbers are included: empty set when empty	{ }
		subset	⊂
triangle	△	intersection	∩
rectangle	▭	union; join	∪
parallelogram	▱	percent	%
circle	○	foot, minute	'
		inch, second	"
line segment (as $\overline{AB}$)	—		

METRIC TABLE

PREFIX	VALUE	LENGTH	CAPACITY	WEIGHT (MASS)
KILO	1000	kilometer* (km)	kiloliter (kl)	kilogram* (kg)
HECTO	100	hectometer (hm)	hectoliter (hl)	hectogram (hg)
DEKA	10	dekameter (dam)	dekaliter (dal)	dekagram (dag)
	1	meter* (m)	liter* (l)	gram* (g)
DECI	$\frac{1}{10}$ or .10	decimeter (dm)	deciliter (dl)	decigram (dg)
CENTI	$\frac{1}{100}$ or .01	centimeter* (cm)	centiliter (cl)	centigram (cg)
MILLI	$\frac{1}{1000}$ or .001	millimeter* (mm)	milliliter (ml)	milligram* (mg)

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* most frequently used

BASIC CLASSROOM EQUIPMENT CHECKLIST

MATERIALS:

Abacus - Class size/individual. ____
Attribute blocks..... ____
Balance Beam..... ____
Calculators..... ____
Calendar - class size..... ____
Clock - large - class size..... ____
Clock - individual size..... ____
Clock - stamp..... ____
Coin stamps..... ____
Compass..... ____
Cubic counting blocks..... ____
Cuisenaire rods..... ____
Dominoes..... ____
Felt cut-outs..... ____
Flannel board..... ____
Flash cards..... ____
Fractional parts (assorted)..... ____
Geo boards..... ____
Geometric patterns..... ____
Hundred charts - class size/ind. ____
Laminating paper..... ____
Magnetic board..... ____
Magnetic discs..... ____
Measuring tools-English, Metric (rulers, scales, compasses, protractors, beakers, cups, spoons, thermometers)..... ____
Number lines - class/individual. ____
Numerals - tactile..... ____
Plastic discs..... ____
Play money..... ____
Powers of Ten..... ____
Protractor..... ____
SEE calculators..... ____
Scale..... ____
Screen (pull-down type)..... ____
Spinners..... ____
Squared place value material.... ____
Standard playing cards..... ____
Tangrams..... ____
Tens frame..... ____
Timers (1,2,3 minute)..... ____
Tokens (various sizes/colors)... ____
Trundle wheel..... ____
Unifix cubes..... ____
Unifix 100 board..... ____

SUPPLIES:

Adding machine tapes (for classroom/ind. number lines)..... ____
Chalk..... ____
Construction paper..... ____
Elastic bands..... ____

BASIC CLASSROOM EQUIPMENT CHECKLIST

SUPPLIES: cont'd

Envelopes (all sizes)..... ____
Erasers, board/individual..... ____
Felt pens (all sizes)..... ____
Ditto, Rexograph paper..... ____
Glue..... ____
Gram weights..... ____
Graph paper (1 cm, <, 1")..... ____
Grease pencils..... ____
Oak tag..... ____
Paper clips..... ____
Paste..... ____
Plastic discs..... ____
Pointer..... ____
Primary pencils..... ____
Rubber bands..... ____
Scissors - primary, left hand.. ____
Scotch tape..... ____
Spinner..... ____
String..... ____
Tape..... ____

COLLECTIBLES:

Beads and beans..... ____
Bottle caps..... ____
Buttons..... ____
Cardboard (all sizes)..... ____
Cereal boxes..... ____
Coffee cans..... ____
Detergent boxes, shoe boxes, meat trays, and plastic containers..... ____
Egg cartons..... ____
Felt for desk mats..... ____
Ice cream sticks..... ____
Juice containers..... ____
Macaroni..... ____
Magazines..... ____
Menus..... ____
Metrically measured cartons.... ____
Milk containers..... ____
Newspapers..... ____
Paper plates..... ____
Sand..... ____
Spools..... ____
String, yarn..... ____
Styrofoam..... ____
Tongue depressors..... ____
Wire hangers..... ____
Ziploc Bags..... ____